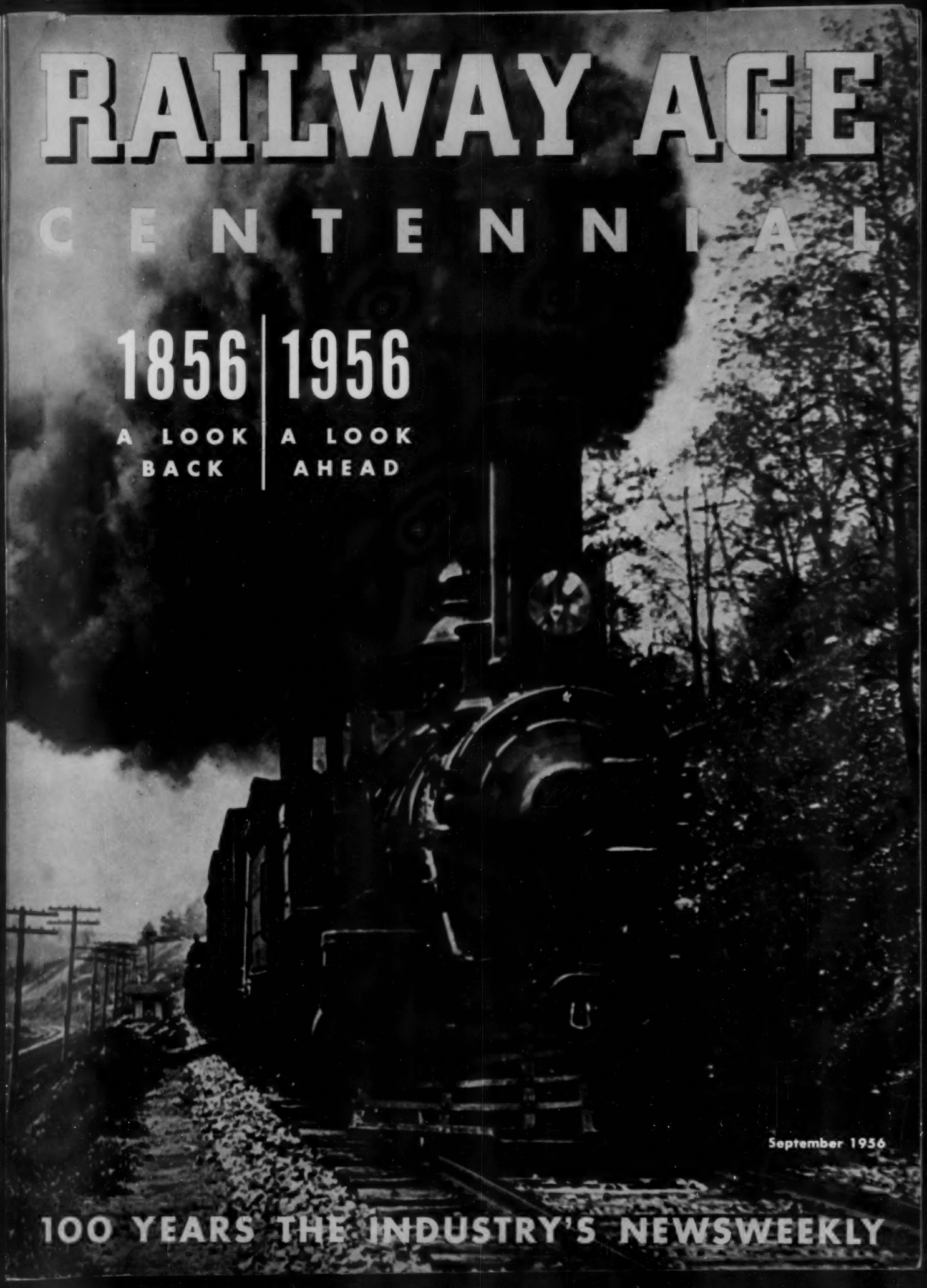
RAILWAY AGE

CENTENNIAL

1856 | 1956

A LOOK BACK | A LOOK AHEAD



September 1956

100 YEARS THE INDUSTRY'S NEWSWEEKLY

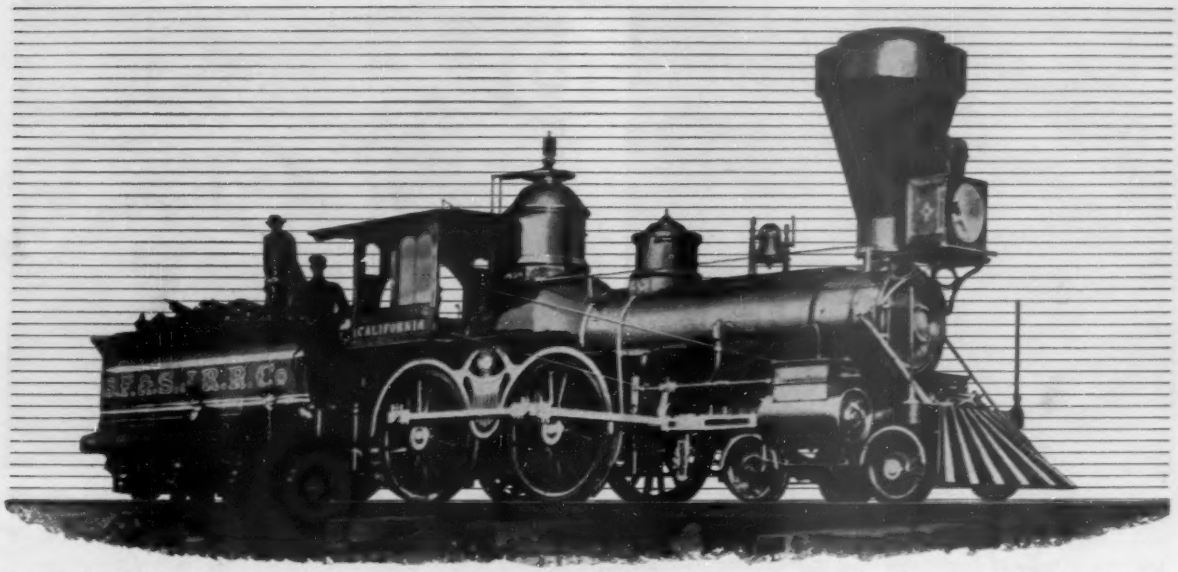
Helping America's Railroads Achieve Their Era of Greatest Progress!

The Kershaw name has been closely associated with progressive railroading since 1890. During that time, and especially during the past decade, Kershaw research and development of track maintenance equipment has played a vital role in revolutionizing track maintenance procedures. Kershaw is proud of the part it has played in helping America's railroads achieve their high standards of operation. We pledge our continued efforts and cooperation with America's railroads for an even greater era during the next one hundred years.

Ballast Regulator, Scarifier and Plow and Attachments • Spot Tamper Ballast Cleaner • Undercutter • Kribbers • Tie Replacer • Tie-Bed Scarifier • Crib-Adze • Rail Re-Layer • Track Broom • Jack-All • Dead Head Detector • Rail Derricks • Track Crane • Universal Set-Off Assembly • Track Mower

Now . . . **more than ever . . .**
Recognize This Symbol of Leadership . . .

KERSHAW
MANUFACTURING CO. INC
MONTGOMERY K **ALABAMA**



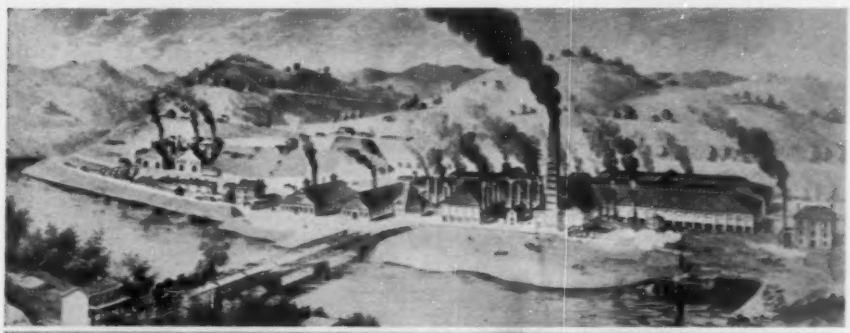
The "California", first standard-gage locomotive built on the West Coast, was constructed in 1864 by Union Iron Works, forerunner of Bethlehem's San Francisco shipyard. The "California" which weighed, fully fueled, 49 tons, is credited with an attained speed of 67 miles an hour.

Reporting a Century of Railroading

On the occasion of *Railway Age's* 100th birthday, Bethlehem Steel Company is glad to say "Happy Centennial!"

***Railway Age* began publication at a time when American railroads were in their infancy, and has continued to stimulate and report their progress all through the century of their amazing growth.**

We are also using this opportunity to take a look at our own company's history, so much of which has been bound up with the progress of the railroads. On this and the following page, we show a few of the ways in which Bethlehem was working for the railroads in the days of *Railway Age's* early youth, and is continuing to serve them today.



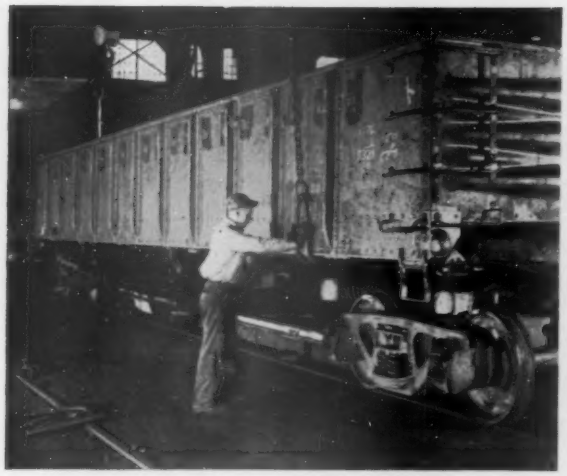
100 years ago, in the 1850's, Bethlehem's Johnstown, Pa., plant was making wrought-iron rails for the Pennsylvania Railroad, then being built across the state. It was at Johnstown, too, that the first steel rails produced commercially in America were rolled, in 1867, from steel produced at Steelton plant.

Bethlehem's plant at Steelton, Pa., shown here as it looked about 1880, was the first plant in America built especially for the production of steel. Much of the plant's early history and growth is inseparable from the great expansion of the railroads in the seventies and eighties.

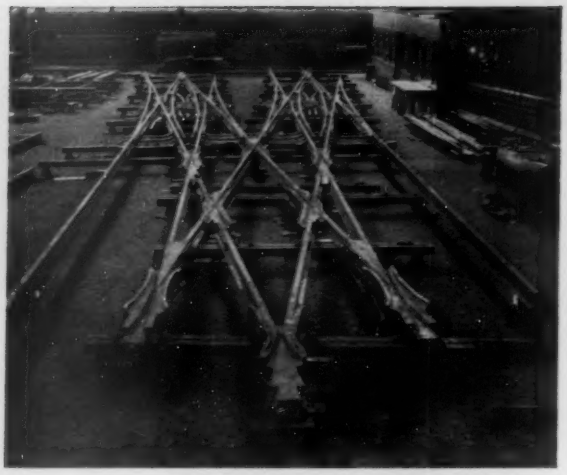
Please turn the page

BETHLEHEM STEEL

BETHLEHEM STEEL



At Bethlehem Steel's Johnstown plant steel freight cars are built on two assembly lines. Parts and components are fed into the lines; the Johnstown plant car shops can turn out a new car every 15 minutes. The various types of freight cars built at Johnstown include flat cars, gondolas, hopper cars and box cars.



An intricate track layout in the frog shop of Bethlehem's Steelton plant. Many of the country's major passenger and freight terminal layouts were fabricated here. It was also at Steelton that controlled cooling of rails to eliminate transverse fissures, and end-hardening of rails to overcome end-batter, were developed.

The forerunner of the type of switch stand now in common use was developed at Steelton in 1894, while the present-day manganese-insert frog is an outgrowth of the anvil-face frog first made here in 1898. Today Steelton plant manufactures a wide variety of steel products for railroads, including frogs, switches and crossings, and track accessories such as splice bars, guard rails, rail braces, tie-plates, gage rods and switch heaters.

• • • • •

Many of the country's crack passenger and freight trains run on wrought-steel wheels and forged-steel axles made at Johnstown. And steel rails made at Bethlehem Steel Company plants at Steelton and at Lackawanna, N. Y., are in use on many of the major railroads throughout the country.

Please turn the page

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

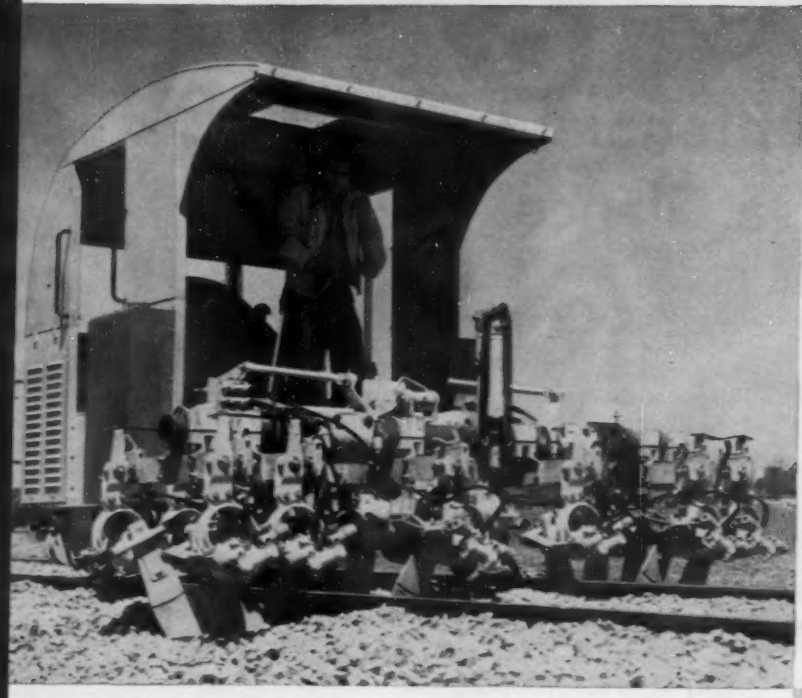
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Railway Age, September 1956, volume 141 No. 14. Published weekly with an additional issue in September by the Simmons-Boardman Publishing Corporation at Orange, Conn., and entered as second class matter at Orange, Conn. Subscription to railroad employes only in U. S., U. S. possessions, Canada and Mexico, $4 one year, $6 two years.

from GANDY-DANCER to . . .



JACKSON MANUALLY GUIDED TIE TAMPERS & POWER PLANTS

Exceedingly efficient and widely used by small gangs in low lifts and smoothing work, cross-overs and spots the on-track machines can not reach.

JACKSON MULTIPLE TIE TAMPER

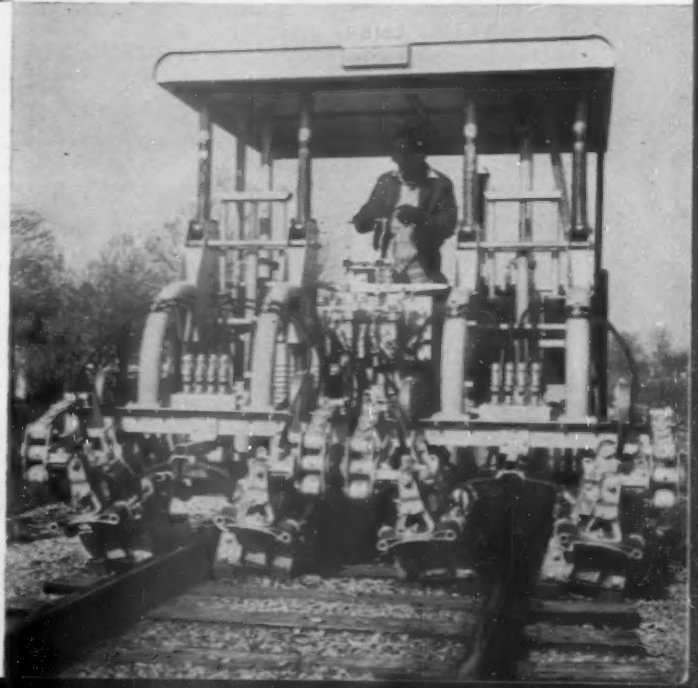
Unsurpassed for putting up track of finest uniform quality in all lifts from the highest to those no lower than average size of ballast used.

JACKSON TRACK MAINTAINER

For both putting up and maintaining track of finest quality under the widest range of track lift and ballast conditions this machine has no equal. Invariably the choice of those who investigate thoroughly.

During our more than 35 years of specialization in the manufacture of tie tamping equipment, the name JACKSON has consistently been synonymous with the best, most economical means of achieving and maintaining track of finest uniform quality under ALL conditions.

Let us help you to the best possible solution to your track tamping problems.



JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN, U.S.A.

1856

Western Railroad Gazette

By another week we intend to have headquarters of our own to hail from. At present, if our friends, and those desiring to patronize us will leave their orders or address with Mr. J. W. Dean at the Printing Rooms of the Tribune Office, their wishes will be promptly attended to.

Small Talk, Local and Otherwise

The great Presidential Election has engrossed the public mind during the past week, to the exclusion of everything else. The constituencies of the several States have been fretting, frothing, and boiling over with excitement, while the warring elements of conflicting sentiments and feelings have furiously clashed together. The result is known to all.

Foreign news grow more and more interesting. Louis Napoleon, sagacious as he is, needs all the nerve and ability he possesses to weather the storm which is impending.

In the way of amusements we have had the usual variety. Miss Stanley, who created such a furore at Niblo's, has been making a ten strike at the Metropolitan. The Theatre has been out in full blast with Miss Mitchell as the star of that *"goodly companie"*—(over the left—shoulder.) Dan Emmit fifes and thumps away every night at the drum outside, bringing into requisition the hoarse lungs of a recent importation from Cork, to call fools together, then goes inside to play nigger and the "old banjo," to admiring audiences.

Another—the most *important* and *best* item of all other weekly news is, that the WESTERN RAILROAD GAZETTE is *out*, (as Bonner says of his Ledger and flashy Cobb stories.) Many unforeseen difficulties have occurred to delay its publication to the present time. Suffice it to say, it's *out* now, and we hope the public, and our friends "foreign and domestic," are pleased, and will give us substantial evidence of their satisfaction by bringing along a peck or two of advertisements to be inserted in our next weeks' issue.

Presidential elections, foreign intrigue and local Chicago vaudeville highlighted the "news" column of the first issue of Railway Age's oldest ancestor.

1956

COVER PHOTO: Altoona-built 2-8-0 (1882), working east on the PRR's Schuylkill division in the nineties, before automatic couplers became universal. Glass plate photo by Wallace Gilchrist, used by courtesy of Paul T. Warner, retired editor, Baldwin Locomotives magazine.

Vol. 141, No. 14
September 1956

Centennial Issue at a Glance

This Issue Carries White Flags . . .

Agreeing with Nietzsche that "many a man fails to become a thinker because his memory is too good," Centenarian Railway Age gives a fascinating past a careful glance—then passes on to assess some important and exciting questions at hand.

There will be much disagreement with what is said in some of the pages that follow. There can be none about the value of discussion.

Report to the readers: 100 Years of Railway Age

This account shows how businesspaper publishing has changed—to pace the changes in railroading. Editorial section beginning on . . . . . p. 83

Starting the Second 100 Years: The Opportunity Ahead

If the goal of the industry is more dynamic growth, the bases from which the effort must start need appraisal. That is the function of this second editorial section—opening on . . . . . p. 157

A Look Back—A Look Around—A Look Ahead

This section takes stock of the railroad business—divided into key segments, or topics. Staff-written for the most part, in addition, signed "Looks Ahead" present *individual* points of view—published as authoritative, but not necessarily commonly accepted, stimulants to discussion. This final editorial section begins on . . . . . p. 253

What's ahead in Railway Signaling?

Intensive research and development by the railway signaling industry is creating new and better systems to help the railroads provide faster and better service at minimum cost. Today, modernization of signaling is recognized as the most effective method for providing more efficient railroad operation to meet the challenge of increasing competition and to protect capital investment.

Modern traffic control systems will continue to offer outstanding economies in the operation of large terminal areas and even entire railroads from one central point. From a control machine at headquarters, operating officers and their staff can, at a glance, get a full picture of traffic conditions at any moment, and can exercise full control of all train movements to obtain the best possible operation.

UNION automatic train identification and routing systems can be applied to enable trains to set up their own routes as they advance . . . reducing the demands on operators so that they can supervise larger territories.

Operation of a train by remote control has already been demonstrated and this undoubtedly will gain further acceptance on railroad and rapid transit systems.

Properly combined, these advanced techniques represent basic elements for the automated railroad of tomorrow! But they offer great possibilities for making train operation much more efficient today . . . and progressive railroads are taking advantage of them.

75 Years
1881
1956
OF EQUIPMENT AND SYSTEMS ENGINEERING . . . . .
UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY

UNION ROUTE INTERLOCKING. With this system an operator selects a route simply by pushing two buttons. All switches and signals are properly aligned automatically for the safe and efficient movement of trains.

What a wonderful

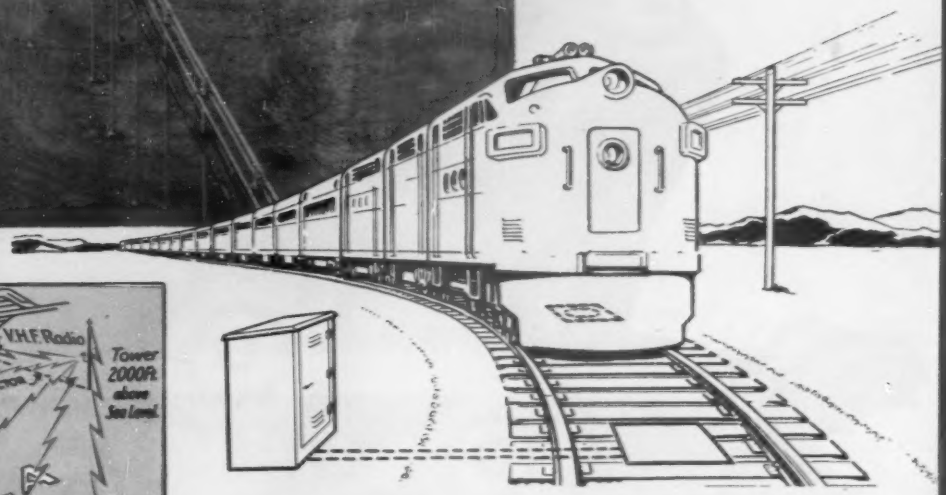
. . . with all the newest UNION Control Systems

TRAFFIC CONTROL SYSTEMS. With UNION C.T.C., train movements on 1000 or more miles of multiple or single track can be directed by signal indications from one control center. Up-to-the-minute information on the traffic situation is provided visually for an entire railroad.

AUTOMATIC TRAIN CONTROL AND CAB SIGNAL SYSTEM. This equipment automatically limits speed or stops the train in accordance with track conditions ahead. In addition, the signal indications are displayed in the cab.

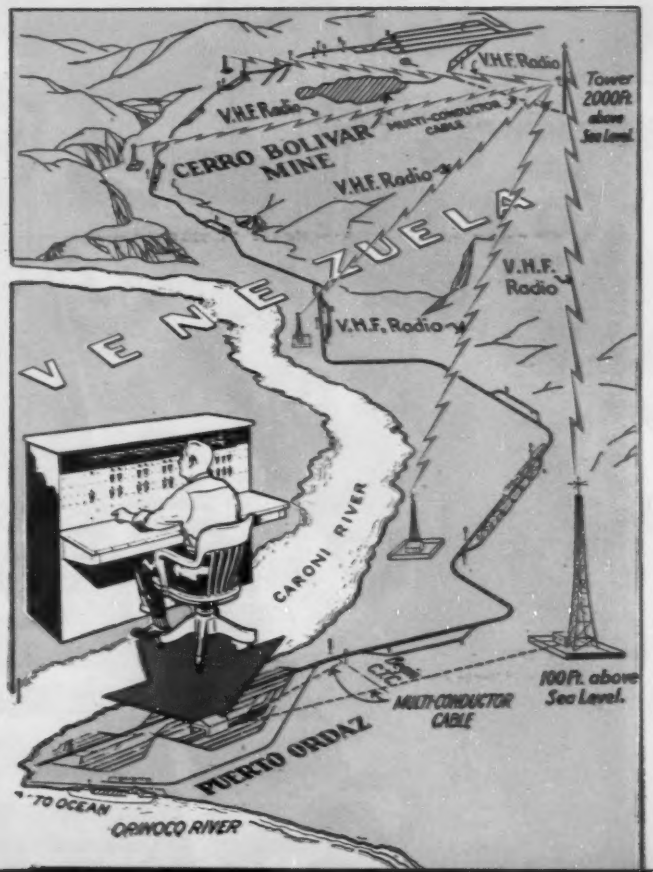
way to run a railroad

AUTOMATIC CONTROL FOR CLASSIFICATION YARDS. A fully automated UNION yard results in lower cost of operation, minimum damage and faster service to shippers. The use of electro-pneumatic retarders and Velac speed control equipment provides the ultimate in modern operation of classification yards.



IDENTRA* SYSTEM. UNION train identification equipment automatically identifies a train, registers its location, aligns switches, clears signals and identifies the approaching train at the station.

*Trademark



C.T.C. BY MICROWAVE. A new railroad in Venezuela is operated with a UNION C. T. C. System which eliminates the usual line wires and uses very high frequency radio. One operator controls train movements over the entire 90 miles of railroad.

1881 1956

75 years of progress

in railway signaling and control systems

1956 marks a year of anniversaries. Union Switch & Signal, celebrating a robust 75 years, takes this opportunity to congratulate Railway Age, a hale and hearty centenarian.

It was back in May, 1881, that George Westinghouse, one of America's greatest inventors, organized The Union Switch and Signal Company to design and manufacture railway signal systems and apparatus. Since that time, Union Switch & Signal has become the world's largest manufacturer of railway and rapid transit signal systems.

A few of the major UNION engineering achievements are shown on the following pages. Read on.

We're Still Youngsters!

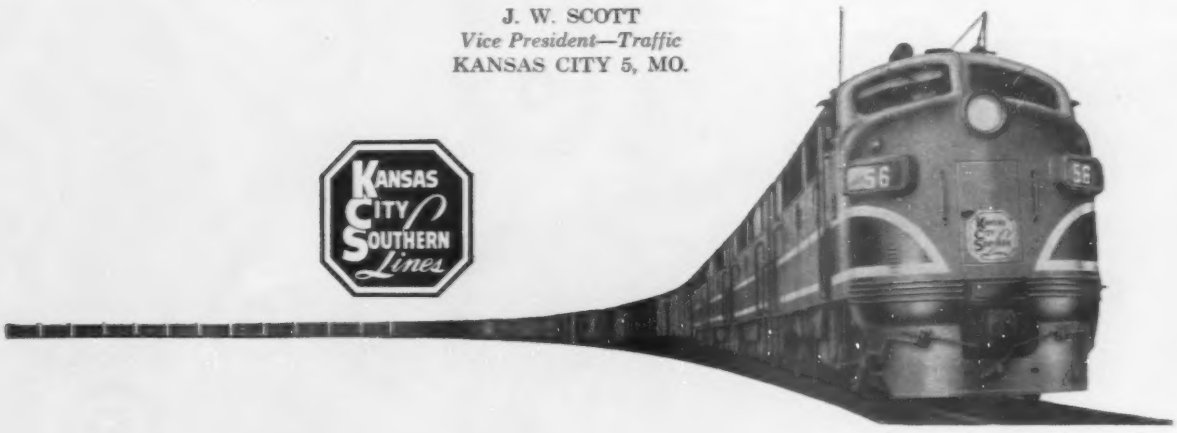
ON SEPTEMBER 11, 1897, the Kansas City Southern began regular operation between Kansas City and Port Arthur — which makes us just 59% as old as Railway Age.

We're still youthful, so far as railroads go, but sufficiently seasoned to know what shippers want . . . *and constantly striving to provide it for them!*

QUICKEST *between* KANSAS CITY *and* FIVE GULF PORTS!

J. W. SCOTT
Vice President—Traffic
KANSAS CITY 5, MO.

KANSAS CITY SOUTHERN *Lines*

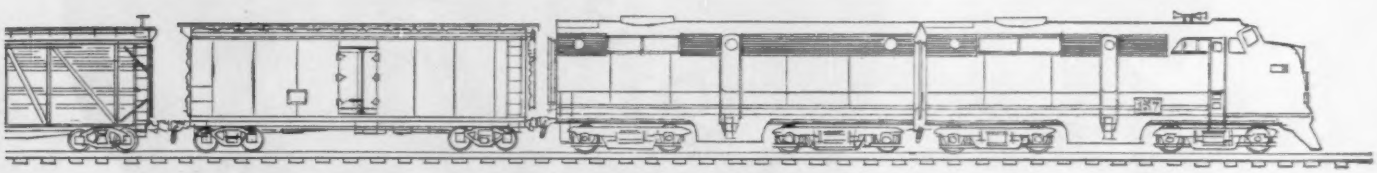


Buy Griffin EQS

FOR LONGER FLANGE AND TREAD WEAR!

The Griffin grain structure on tread and flange is at right angles to the rail—giving you a longer-lasting wheel.

Because of advanced casting methods . . . pressure pouring in machined graphite molds . . . the roundness of the Griffin EQS is practically perfect as cast. Absolutely no tread machining is necessary. The toughest metal *stays* where it reduces your costs . . . at the point of contact with the rail!



GRIFFIN EQS

E LECTRIC Q UALITY S TEEL

Griffin Wheel Company
445 N. Sacramento Blvd., Chicago 12
Plants strategically located to serve all railroads

Give the "green" to GRIFFIN and watch your costs go down!

why most R. R. men look

OAKITE gives you the IMPORTANT advantage

on Oakite Cleaning as the Standard for maintenance operations

When railroad men tell us "nothing does the job as good as Oakite," they're saying, in effect, that Oakite Materials are the standard for comparing *cleaning efficiency*. We've heard such comments again and again . . . deserved for the best of reasons:

KEYED TO RAILROAD NEEDS

Especially formulated for railroads, Oakite materials offer the best possible answers for such jobs as car washing, truck and undercarriage cleaning, parts cleaning for overhaul or inspection, and many more. Each Oakite compound contains a proper balance of *all* needed ingredients, nothing less. No cutting corners on quality. That's why men who've seen Oakite materials in action know that better results can't be had.

RESEARCH FOR RAILROADS

Oakite has pioneered almost every modern mechanical cleaning development to replace outmoded costly manual methods. This was achieved not by imitation of others but by painstaking research in modern Oakite laboratories and by working side by side with railroad personnel. Constant improvement is a continuous program at Oakite.

CUSTOMER AID

The Oakite facilities, experience and engineering know-how are always available to railroad men. Many times blueprints are furnished for cleaning equipment easily made in your own shops. What happens when a cleaning problem's new to both of us? Oakite sticks with it until it's solved.

ILLUSTRATED BOOKLET AVAILABLE

The full story on Oakite's contribution to lower cost, speedier cleaning in railroading is detailed in Booklet No. F8055. Write Oakite Products, Inc., 46 Rector Street, New York 6, New York.

RAILROAD DIVISION

. . . LOW-COST END RESULTS

SPECIALIZED INDUSTRIAL CLEANING
OAKITE®
MATERIALS · METHODS · SERVICE
SCIENCE

Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

It's NEW..

SINCLAIR LITHIUM

ROLLER BEARING

AAR APPROVED

New — but already proven by hundreds of thousands of miles of service to be outstanding for car and locomotive roller bearing lubrication.

Sinclair Lithium "RB" Grease is a uniform smooth grease having superior mechanical stability.

Sinclair Lithium "RB" Grease has excellent resistance to oxidation and is non-corrosive to bronze and other bearing materials.

Sturdy Sinclair Lithium "RB" Grease flows readily at low operating temperatures yet will not thin out at high operating temperatures or under heavy loads.

SINCLAIR RAILROAD LUBRICANTS

Sinclair Refining Company, Railway Sales, New York • Chicago • St. Louis • Houston

GREASE

MEMO TO ALL SHIPPERS

The Peoria Gateway is faster than ever. Let us prove it.

R. W. Nelson V.P. Traffic

24 HOURS EARLIER!

THE M·St.L's *NEW* FASTER-THAN-EVER FREIGHT SERVICE TO THE *EAST*...

FROM MINNEAPOLIS-ST. PAUL

(Including Minnesota Transfer — New Brighton)

VIA NICKEL PLATE

To NEW YORK (Metropolitan area): Early fourth morning delivery via Lackawanna, Lehigh Valley or Erie.

To BUFFALO, CLEVELAND: Second evening arrival.

To PHILADELPHIA: Early fourth morning delivery via Lackawanna-CNJ-Reading, PWV-WM-Reading, LV-Reading.

VIA TP&W-PENN

To NEW YORK (Metropolitan area): Early fourth morning delivery.

To BALTIMORE: Early fourth morning delivery.

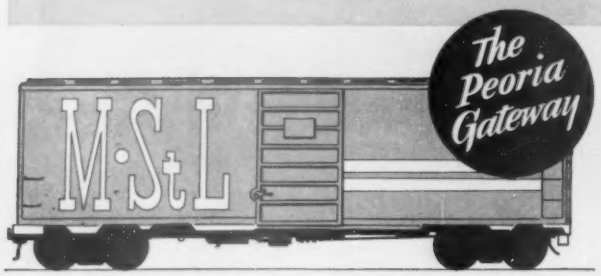
To PHILADELPHIA: Early fourth morning delivery.

VIA NY CENTRAL

To NEW YORK (Metropolitan area): Early fourth morning delivery.

To INDIANAPOLIS: Second morning delivery.

To CLEVELAND: Second morning delivery.



The MINNEAPOLIS & ST LOUIS RAILWAY Co.

MINNEAPOLIS 4, MINNESOTA

DEDICATED TO BETTER RAILROADING

The Ton-Mile

AMERICAN Brake Shoe COMPANY

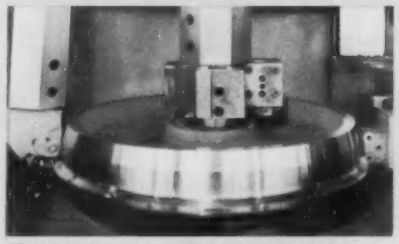
THE TONNAGE TRAVELS BY RAIL: From the heart of the grain country rolls close to a billion bushels of wheat annually.

precision . . . and the Southern® cast steel wheel!

Because all finished surfaces on our new cast steel wheel are machined *at once*—many customers tell us they've never seen a freight car wheel so uniform from one wheel to the next and from one shipment to another. They tell us this shotblasted 1.5% carbon wheel is by far the easiest to inspect, and the easiest to bore and mount.

Yes, the machining assures a true, well balanced wheel—but uniformity of product, structurally and dimensionally, comes first. In the country's most modern wheel plant at Calera, Ala., latest foundry techniques provide an economical process; and the most advanced methods for quality control assure a quality product.

In service, the Southern steel wheel is easy on the track, easy on the lading, easy on the budget. Average life is measured in the hundreds of thousands of miles. Specify this new cast steel wheel for true over-all economy!



Tread and flange contour, rim face, hub face, and bore are machined *at a single chucking* on special vertical turret lathes which set new standards of precision for freight car wheel rotundity and concentricity.

SOUTHERN WHEEL DIVISION

A-1400

AMERICAN Brake Shoe COMPANY

230 PARK AVENUE, NEW YORK 17, N.Y.

Supplier Teamwork *means Better Railroading*

By Kempton Dunn—President, American Brake Shoe Company

"Better railroading," as we at American Brake Shoe see it, is a lot more than just a slogan. To us, it's a positive program of improvement—of helping railroads solve problems that constantly changing conditions impose upon them.

The first step in improving anything is recognizing that there's *room* for improvement. This isn't always easy.

Take the case of the railway supply industry. The healthy competition for the railroads' tremendous volume of purchases sometimes tends to obscure suppliers' awareness of their common problems. The Railway Business Association, organized in 1908, wasn't actively geared to the needs of the 1950's.

As a result of the study and recommendations of a committee headed by Maurice Trainer—then Vice-Chairman of Brake Shoe—the RBA was reorganized in May, 1955 as the Railway Progress Institute. The main object of the reorganization was to provide the entire railway supply industry with a really effective voice and promotional arm.

RPI's method of operation, as revealed in its first year's work, is not only to help its members directly, but also to do everything possible to help the railroads themselves. This is obviously a policy of enlightened self-interest, but one which we feel the railway supply industry has needed for a long time. Though scarcely a year old, RPI has already completed the job of organizing and staffing. It has enlisted the active support of nearly a hundred firms representing all branches of the industry. It has helped establish harmony among various railway interests; and it has formed close working bonds with the AAR, with the major regional associations, and with many individual railroads as well.

RPI is thus "a going concern." As such, it is tackling some tough problems that vitally affect everyone connected with railroading. For instance:

Railroads must be allowed to compete. Establishing this concept, the very heart of the Weeks Report, will require a tremendous job of public education. RPI is determined to do its share.

Legislative leaders need accurate, up-to-date information on the railway supply industry to help formulate fair and intelligent policies. RPI will provide valuable services in this area.

Railroads themselves could benefit from better coordination and scheduling of major purchases. Tangible accomplishments by the RPI along these lines could result in big savings for individual roads, and could effect a marked improvement in the stability of the railway supply industry.

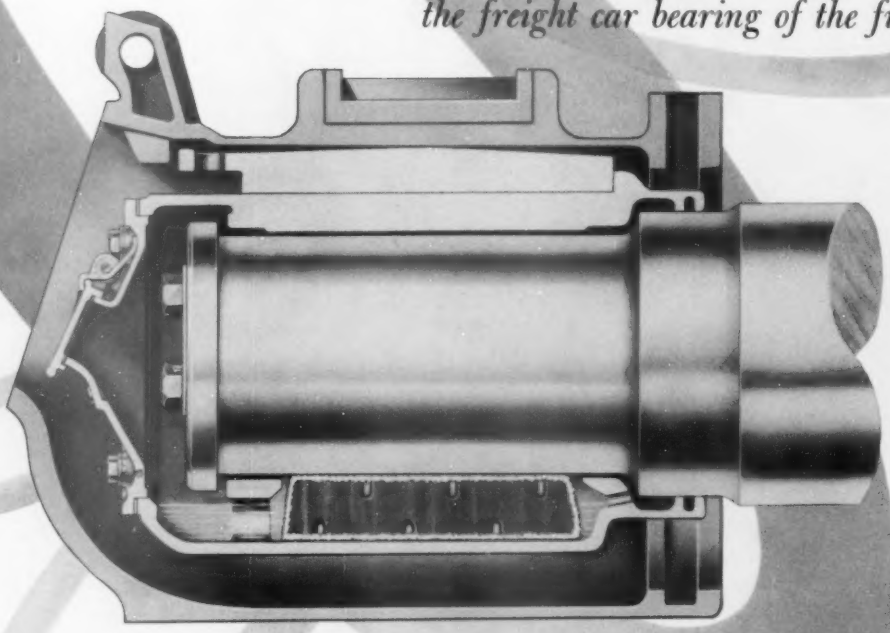
These are big objectives, but they strike us as being objectives well worth working for. But it will take teamwork within the industry. That's why we're backing the new RPI to the utmost. And we hope all the other major railway suppliers will too—in the ultimate interest of *better railroading.*

GEARED TO PROGRESS
RPI
MEMBER

American Brake Shoe Company TON-MILE

TOMORROW'S JOURNAL BEARING?

This economical cartridge unit, now being road tested, may well prove to be the freight car bearing of the future



"WHAT kind of bearing would combine the advantages of the solid bearing with the more desirable features of roller bearings?" Some years ago our National Bearing Division engineers set out to answer this question.

Take a good look at the result—at the cartridge bearing unit shown on these pages. For this revolutionary new concept in journal bearing design has a fine chance of becoming *the* freight car bearing of the future.

Why? To begin with, this cartridge bearing is a complete, sealed, bearing and lubrication system. Like other precision bearings of the sleeve type, it completely encircles the journal, so it cannot lift or shift. It contains its own oil reservoir, Redipak® lubricating pad, cover, and seal.

The cartridge bearing fits the standard journal box, with a standard flat-back wedge, after the dust box well has been cut out. Since it has its own cover, the standard journal box lid is not used. The journal collar is machined off to permit assembly, and a separate collar is applied with cap screws. The Redipak lubricating pad is installed in place before the bearing is applied to the journal.

Many engineering refinements are incorporated in this new cartridge unit. It is cast of high strength bronze, which is precision machined for accurately maintained clearance, and plated with a heavy-duty lead-tin alloy lining of the type used in diesel engine crankshaft and connecting rod bearings. A single felt seal, lubricated for low friction and long life, rides on the conventional axle dust guard seat. A properly proportioned amount of both free lateral and snubbed lateral are built into the bearing, to reduce impact in the truck structure and to promote easy riding on rough track. Free lateral is sufficiently restrained so that the seal cannot ride off the axle dust guard seat.

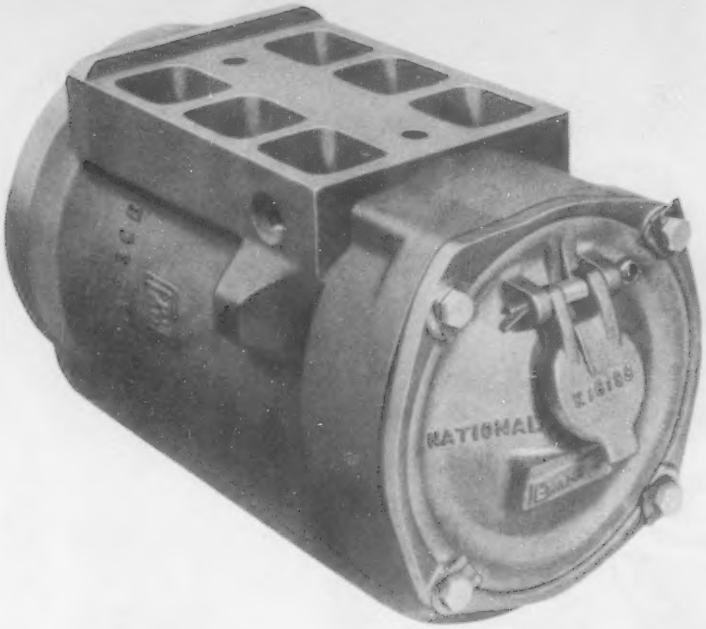
What are the chief advantages of this cartridge bearing?

First is its ability to withstand impact and braking forces. In this respect it is superior to the conventional solid bearing—and to the roller bearing, in which heavy impact causes "Brinelling" of the races and early failure.

Second is freedom from maintenance. The only attention needed—in hottest or coldest weather—is an occasional check of the oil level and replenishment if necessary. At present we suggest a check every 3,000 miles.

Third, long life. In our tests to date, no measurable wear has occurred on either bearings or journals in over a year's accelerated road service.

Fourth, freedom from hot boxes. Being a completely sealed bearing, with its own lubrication system, the cartridge can be expected to avoid the hot box problem.



The cartridge bearing completely encircles the journal, contains its own lubrication system, and is effectively sealed by a lubricated felt ring riding on the conventional dust guard diameter. The twin Redipak lubricating pad is installed when the cartridge is applied to the axle. Oil is contained in the cartridge, not the box. The usual journal box lid is not needed.

Fifth, economy. First cost of the cartridge is far below that of the roller bearing. Installation costs are much less. Removal costs are less when wheel change is needed.

How "far along" is this new cartridge unit? How thoroughly has it been tested?

Various versions of the cartridge have been tested for over a year in our own special journal bearing laboratory. In this recently completed lab, every extreme of climate, load, speed, and misalignment can be duplicated. In addition, service tests on three roads are validating our lab findings. AAR tests were started in June, and results should be available shortly.

What do these tests show?

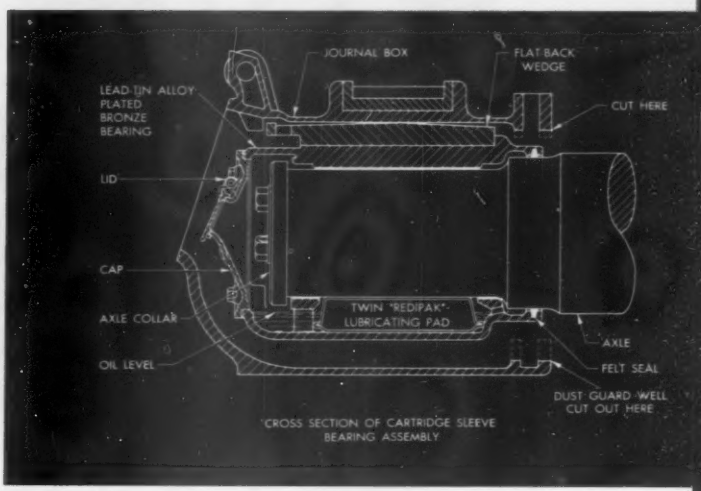
On the Erie, two units have been in continuous service for a year, on a passenger coach in both main line and commuter service. The routes have plenty of curves causing lots of end thrust. Performance: perfect.

On the Great Northern, fourteen round trips of 1,078 miles were made between Superior, Wis. and Minot, N.D. This "Operation Deepfreeze" was conducted to test the cartridges in the severest winter conditions possible. The temperature was below zero most of the time—it dropped to 40 below repeatedly—and there was plenty of snow! The test car was a wheel car, sometimes fully loaded, other times empty. Lots of switching and impact. As a result of this test a minor change was made in the venting to prevent entrance of fine powdered snow.

On the Santa Fe, we have recently finished just the opposite test—"Operation Sand & Sweat." Through some of the fiercest desert country to be found anywhere (Cleburne, Texas to San Bernardino, Calif.) we operated a fully loaded motor and generator car 1,495 miles each way. By September twelve round trips were finished. Results have been excellent, with an indicated oil consumption under 0.4 oz. per 1,000 miles.

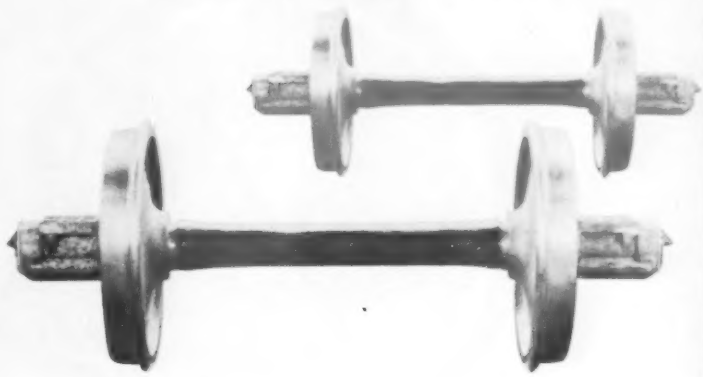
The AAR tests (mainly laboratory tests) have only recently been conducted as this article goes to press.

What does all this mean to the railroads? Simply this: Here is a simple, practical, economical freight car journal bearing . . . designed and built for today's and tomorrow's most extreme operating conditions . . . which can be easily



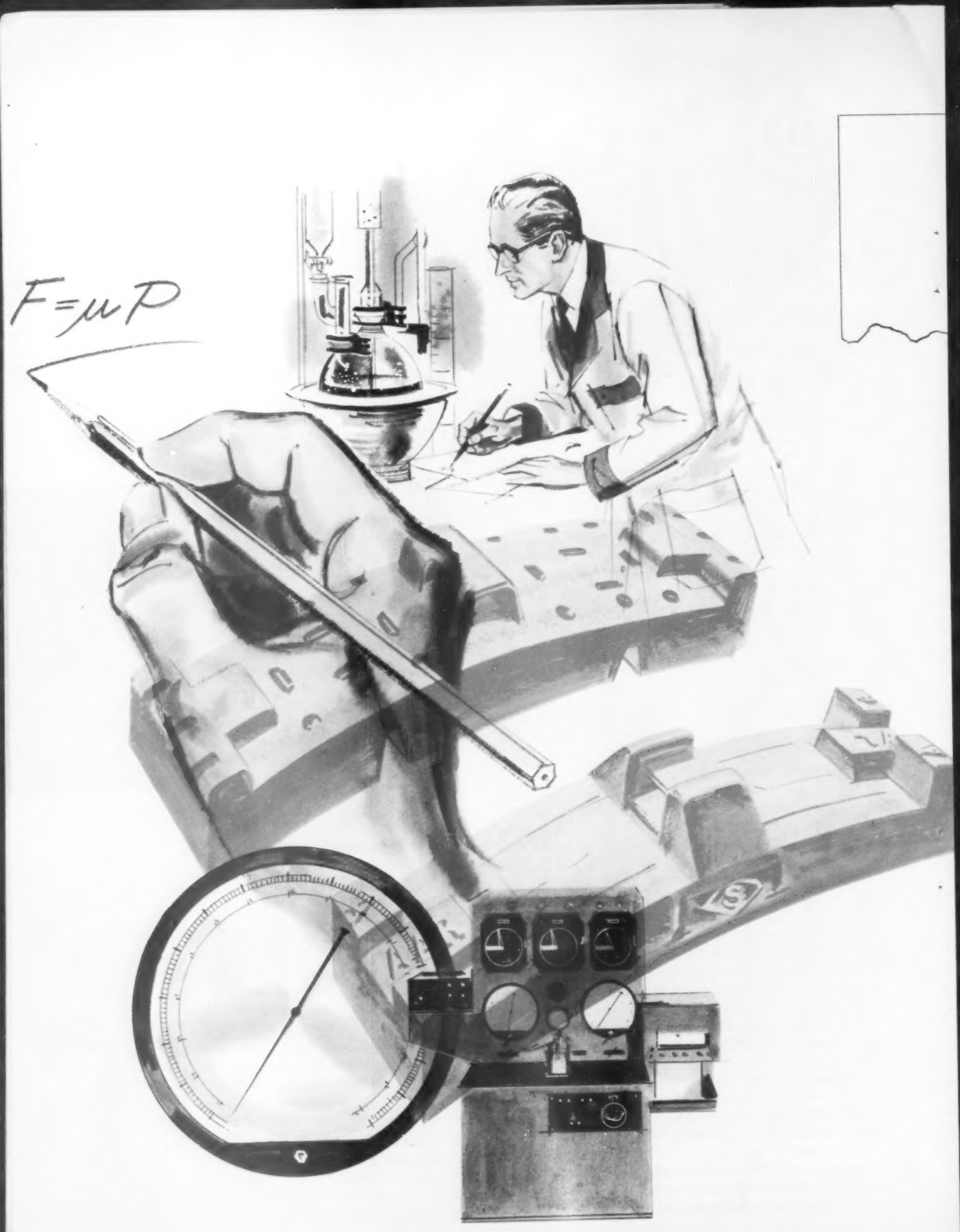
CROSS SECTION OF CARTRIDGE SLEEVE BEARING ASSEMBLY

Wheel, axle and cartridge sets are made up in advance for assembly into trucks. No bearing work is done on the rip track.



applied and removed, without expensive labor or elaborate equipment . . . readily maintained by existing manpower, on a very infrequent basis . . . and which seems to perform as well as any mechanism can. Doesn't this add up to—*the freight car journal bearing of tomorrow?*

AMERICAN Brake Shoe COMPANY TON-MILE


F=μP

out of the

ceaseless search

for better

brake shoes

FACTS... for your evaluation

Recently we published an article covering our continuing research on different types of brake shoe materials. This article, essentially a progress report, contains a factual analysis of the composition shoe which has aroused so much interest that we are highlighting our findings herewith:

1. At their present state of development, composition shoes last from two to three times as long as iron shoes. Road tests confirm laboratory results in this respect.

2. Comprehensive tests, both road and laboratory, indicate that greater wheel wear is an inevitable result of today's compositions' high coefficient of friction and longer life.

3. A practical composition shoe—one which will add the advantages inherent in composition to the proven characteristics of iron . . . for mixed-consist and interchange service—has yet to be perfected. This is our top research project.

We urge you to test and compare our brake shoes, both metal and composition, with any other shoe. Your American Brake Shoe representative will be glad to present the full facts, as revealed by laboratory and service tests, for your evaluation.

AMERICAN Brake Shoe COMPANY

BRAKE SHOE AND CASTINGS DIVISION

NEW YORK 17, N. Y.

IN CANADA: DOMINION BRAKE SHOE CO., LTD.

Welders from all over the country learn tricks of rebuilding manganese trackwork in this unique Amsco school

How do you work with "the toughest steel known"? That's what track men come to the Amsco railroad welding school to find out.

Rebuilding worn frogs and crossovers of *manganese* steel is an art in itself. You *can* rebuild these vital manganese parts if you know how. Explaining how, showing how, and practicing how are accomplished in an unusual American Brake Shoe school established for this one purpose near Chicago. Here at the American Manganese Steel Division plant in Chicago Heights, Bill George and his staff pass along their years of practical experience to men who are already skilled welders in their own right.

The Amsco railroad school is not a welding school. Rather, it gives a concentrated course in techniques of maintaining manganese trackwork—with emphasis on inspection, grinding and the special welding procedures which experience has shown necessary. As much time is devoted to the *why* as to the *what* and *how*.

A Full Week

Each class spends a full week at the school. And Bill George sees to it that it's a *full* week! Into that week Bill tries to pack the important things he's learned in a lifetime of track maintenance . . . plus some metallurgy . . . plus an appreciation of the fine points of making superior trackwork . . . plus enough know-how and show-how so the "students" can pass their new knowledge along to their associates when they get back on track.

The school shop has six welding machines, gas welding and cutting equipment, work benches, exhaust fans, hoists, arc length monitor meters, arc shields, pneumatic grinders, peening tools and other equipment.

The classroom is separate from the shop, and contains clothes lockers, desks, chairs, and a blackboard. Met lab equipment is also utilized.

Here's what Bill George—and his assistant, Charlie Sexton—cover during a typical week: basic metallurgy of manganese steel, types of electrodes and properties, preparation of castings for welding, welding equipment and techniques, and finish grinding to gauge. Much of the time is spent in the school shop, where worn track castings are provided to practice on, and where the effects of proper and improper procedures and welding techniques can be observed. In addition, tours of the Amsco foundries and Racor trackwork plants are dovetailed into the crowded week's schedule.

Highlights

What are some of the things the welders learn?

"Probably the most important point," says Bill George, "is the need for keeping down the heat buildup in the casting and the weld. Cooling with water periodically will help, but skip-welding techniques (welding first in one place and then another) are far better. A little care during trackwork rebuilding pays big dividends."

Some manganese frogs and crossovers can be repaired without any welding at all. "You'd be surprised what a little grinding in the right spots can do," Bill points out. "For instance, the work-hardened metal on frog points may start rolling over and closing up the flangeways. If you let this go on, the wheel flanges will start breaking this metal out—then you have to build up the point again. But if you grind off the rolled-over metal, you can keep the frog in first class shape a lot longer—and save a lot of wear and tear on wheel flanges. It's hard to do by eye—but Amsco's simple little gauge shows where to grind off the metal. Usually you don't have to take off much."

As for welding, "when you do have to weld manganese," Bill explains, "it's absolutely necessary to grind off all the work-hardened surface metal. Sometimes that means going pretty deep. If you burn it out, you have to keep the base metal cool. We use a burning method that keeps the base casting so cool you can practically put your bare hand on it right after you're finished! Our welding techniques are aimed at low temperatures, and avoidance of surface cracks. These are easy for a good welder, once he's been shown how and has had a little practice."

Bill George prefers to keep his class small, under a dozen if possible. When he's not teaching a group at Chicago Heights, he's often out on the job helping railroad men with tough track maintenance problems.

Who can attend this Amsco school? "Any railroad man who wants to learn more about taking care of manganese trackwork," Bill says. "All he's got to do is write me a letter. New groups are starting all the time. We'll fit him in soon as we can."

Bill George shows a group of welders how to run a proper bead on a manganese steel frog. Bill's associate, Charlie Sexton, is at left.

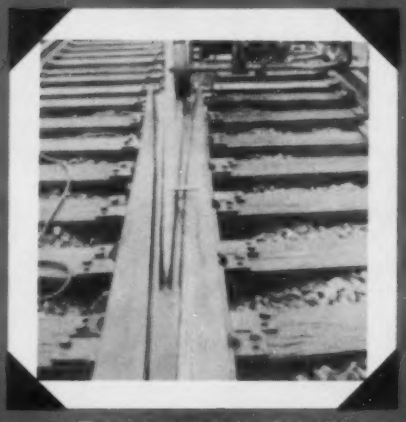
Snap Shots

Where the KC&S crosses the Frisco. Gauge shows how battering has caused narrow flangeway where grinding has been neglected.

A recent "graduating class" of the Amsco trackwork welding school in Chicago Heights. Seated are E. Stratton, M. Mosing, G. Waterloo and A. Meyers, of the Great Northern; W. A. Snyder, of the Pennsy; and Harry Sweeny and Bill George of Amsco. Standing are G. L. Whetnail, Pennsy; D. M. Curry and J. H. De Boeuf of the C&EI; H. Edberg of Minnesota Transfer; M. Musacchia of the Nickel Plate; and J. W. Baldwin and Charlie Sexton of Amsco.

Using the Amsco gauge to check grinding of manganese steel frog on the D&H. James W. Cummings, Supervisor of Work Equipment, positions the gauge as welders John Newcomb and George Lawton look on.

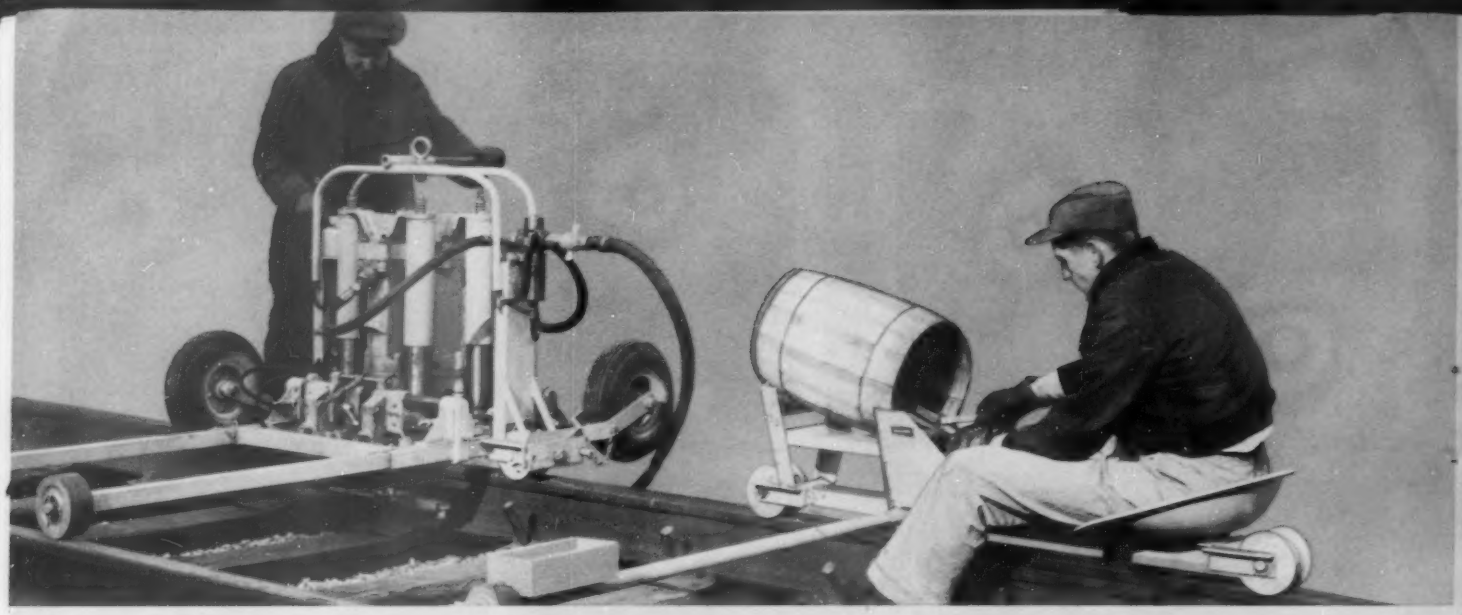
Bill George "puts the show on the road" whenever he can. Last fall he instructed this Southern Pacific group.



These two photos show the Amsco gauge checking narrow flangeways. Often they can be brought back to gauge by grinding.

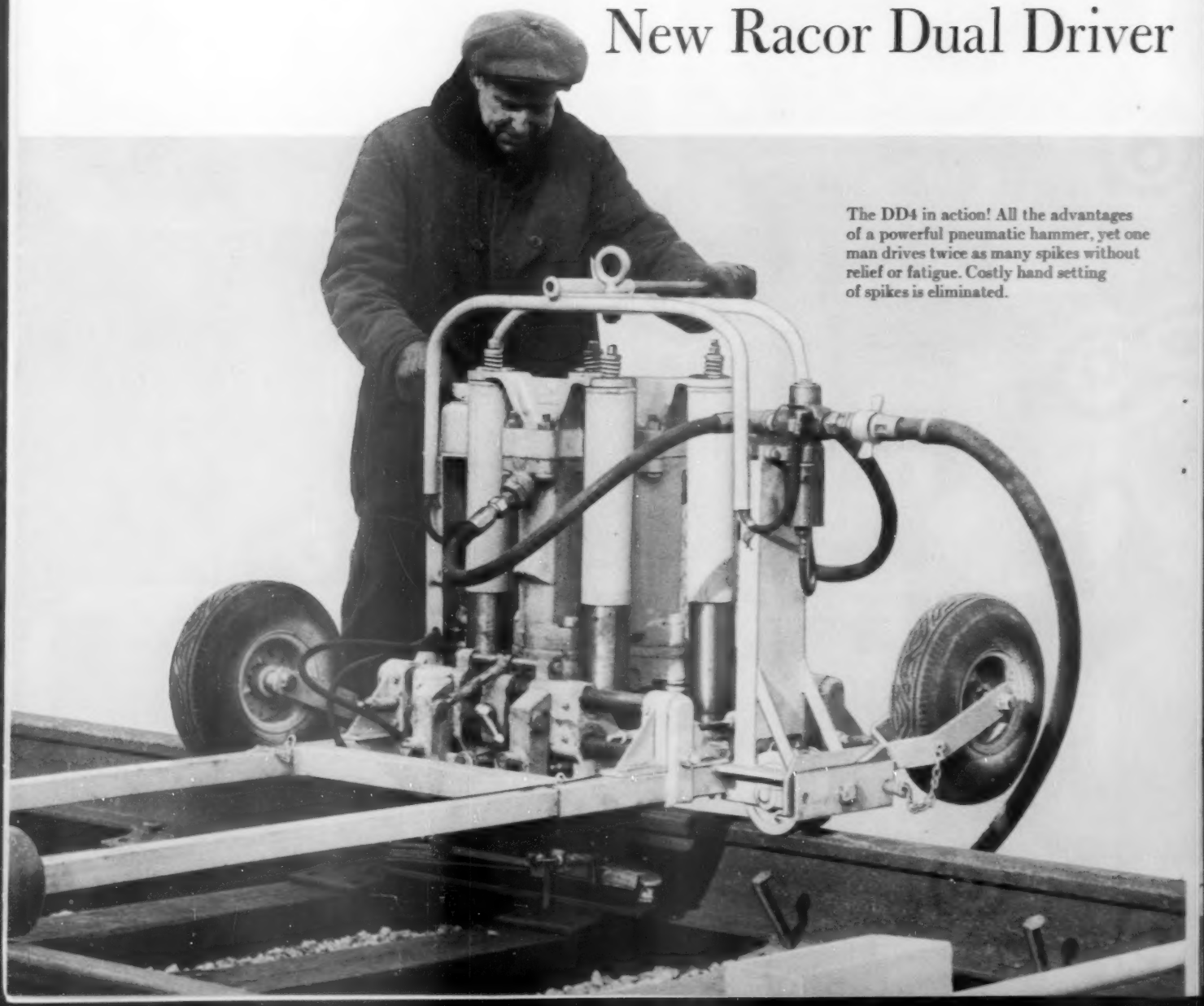
Dave Bell's Amsco gauge shows narrow flangeway developing under traffic on the Frisco. Grinding now will prevent spalling later.

"On the spot" instruction helps a Denver & Rio Grande maintenance gang in its own territory.

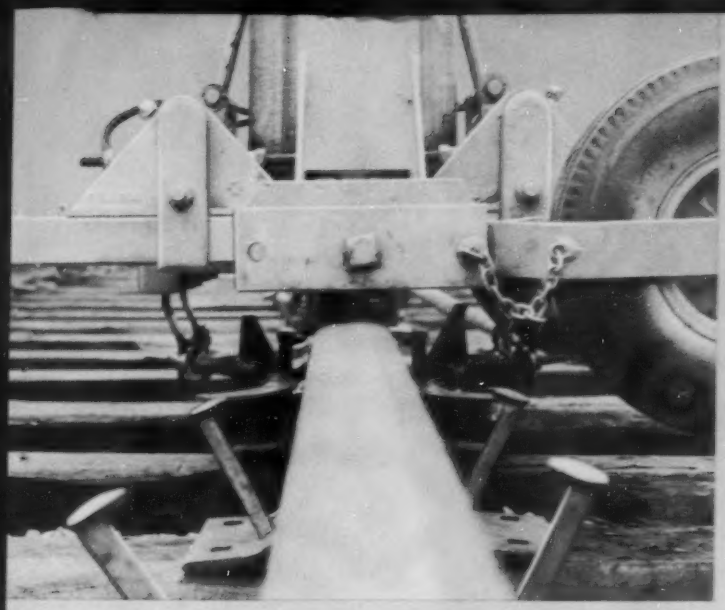


A spiking team—one man on a Racor Distributing Carriage places the spikes loosely in the line spike holes. Another man drives two spikes at once by operating the control handle of the DD4. Release of the control handle readies the Dual Driver for the next pair of spikes.

New Racor Dual Driver



The DD4 in action! All the advantages of a powerful pneumatic hammer, yet one man drives twice as many spikes without relief or fatigue. Costly hand setting of spikes is eliminated.



The spikes are automatically picked up and held vertical for driving by the Dual Driver. The spikes may be leaned either toward or away from the rail as shown here.

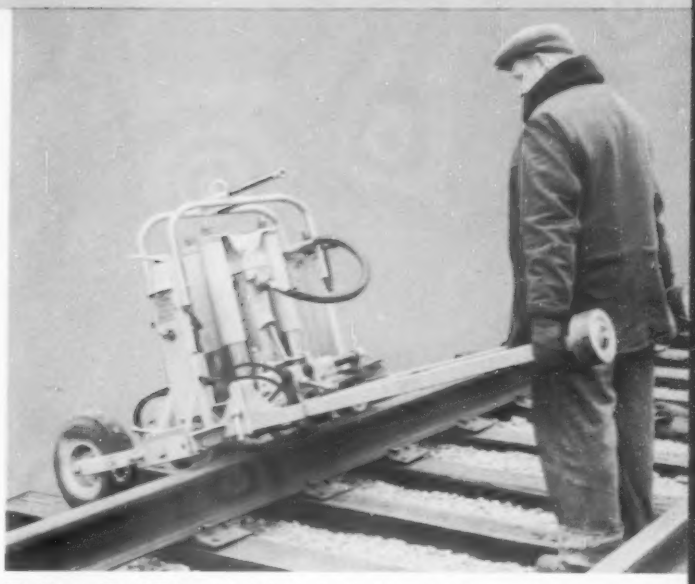
cuts line spiking costs!

Actual experience on many miles of track has *proven* that the Racor Dual Driver DD4 effects substantial reduction in line spiking costs:

One man can easily drive at least twice as many spikes as any other spike driver. After spikes are distributed to the tie plate holes, the DD4 positions them for driving, drives two spikes at once, and automatically resets for the next pair of spikes.

The DD4 can also drive Racor Studs!

Why not see how this new Racor Dual Driver can best fit into your own maintenance-of-way plans? Your Ramapo representative will be glad to consult with you about your road's specific conditions and requirements.



The Racor Dual Driver is easily removed from track.

Also drives Racor Studs! The Racor Dual Driver can quickly be adapted in the field for driving Racor Studs in the anchor position of the tie plate.

AMERICAN
Brake Shoe
COMPANY

RAMAPO AJAX DIVISION

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X Equals Better Railroading

At strategic points throughout the country, American Brake Shoe plants do much more than turn out quality railroad products. In a very real sense, they are literally at your service.

Here's an example of what we mean. Recently a famous streamliner was rerouted over another road. Switches, crossovers, and other trackwork specialties for about a hundred miles had to be replaced or modified for higher speeds. An "impossible" job—one that ordinarily would have taken several months—was accomplished in a few weeks . . . thanks largely to teamwork between the railroad men themselves and the various plants of our Ramapo Ajax Division.

While needs such as these don't occur every day, we'd like to point out that the same comprehensive facilities, the same experienced manpower, are always at your service. They are truly yours to command . . . in the practical interests of *better railroading*.

AMERICAN
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BETTER
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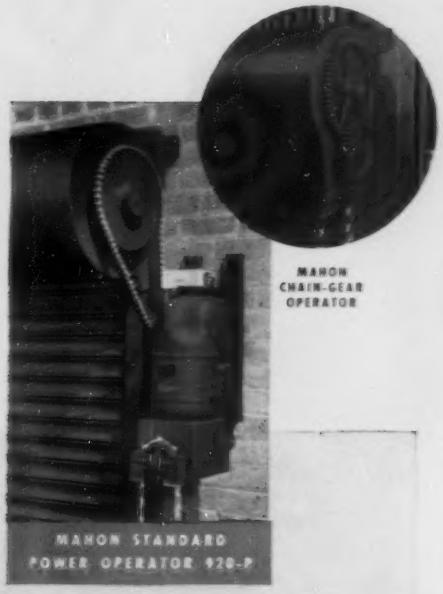
Rolling Steel Doors

Manually, Mechanically, or Electrically Operated



MAHON CHAIN-GEAR OPERATOR

MAHON STANDARD POWER OPERATOR 920-P

For maximum protection, permanence, long life, and convenient, timesaving operation, most people, today, choose a good, power-operated rolling steel door. No other type of door can match their compactness in operation . . . the vertical roll-up action of the door curtain occupies no usable space either inside or outside the opening—and, there are no overhead tracks or other obstructions to interfere with material stacking or crane handling adjacent to door openings. A quick-opening, quick-closing Mahon power-operated Rolling Steel Door will save valuable time and valuable space in any type of opening. In addition, Mahon Rolling Steel Doors are permanent—their all-metal construction assures a lifetime of trouble-free service, and provides maximum protection against intrusion or fire . . . they require less maintenance, too, because, when the door is open, the interlocking steel curtain is rolled up above the opening safe from damage. When you select a Rolling Steel Door, check specifications carefully . . . you will find extra-value features in Mahon doors—for instance, the galvanized steel strip, from which the interlocking curtain slats are rolled, is Bonderized and dip-coated with synthetic enamel which is baked on at 350° F. prior to roll-forming. You will find other important Mahon features in both design and materials that add up to a greater over-all value. See Sweet's Files for complete information, or write for Mahon Catalog G-56.

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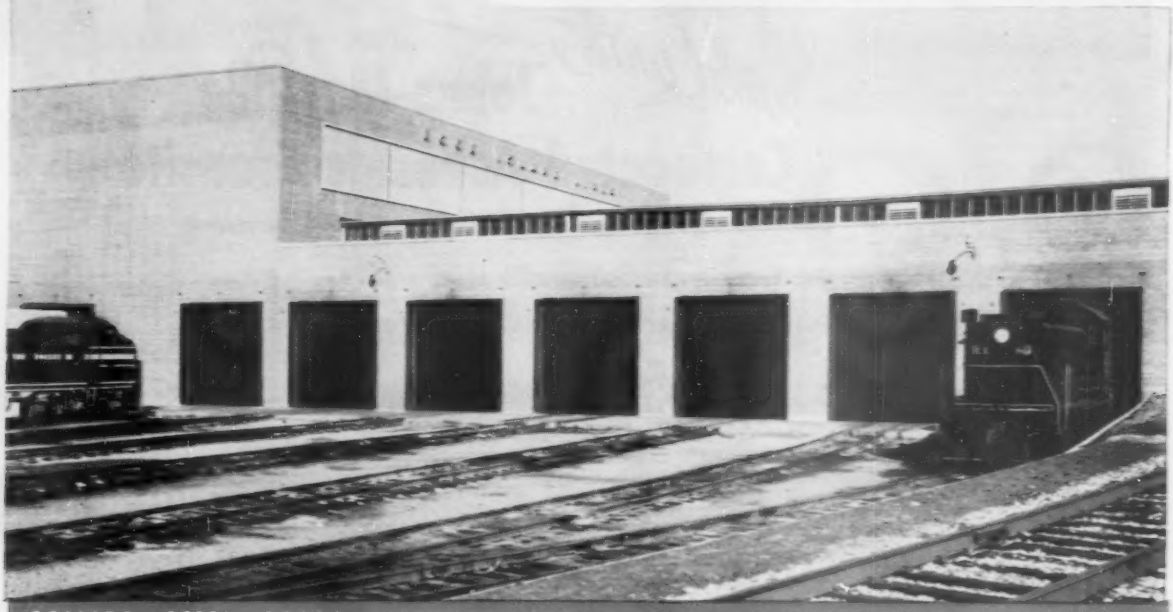
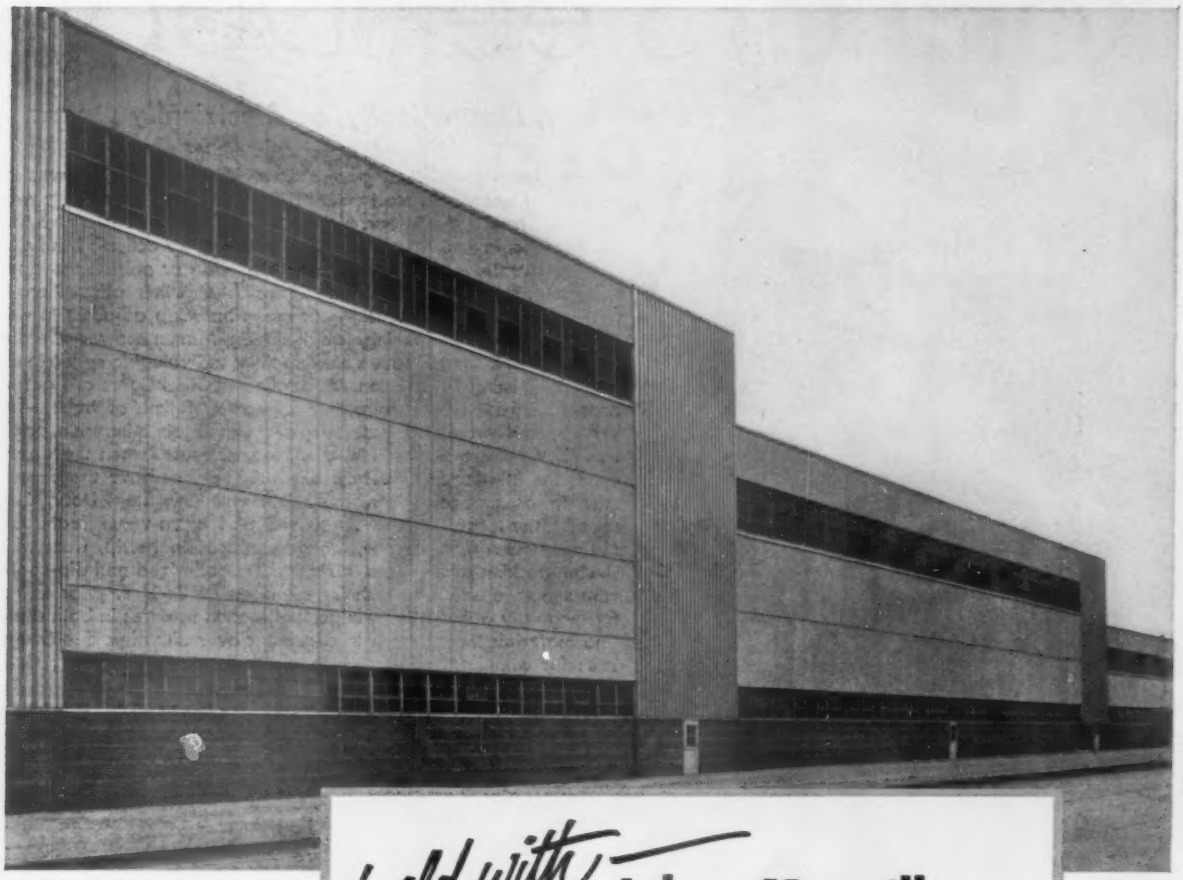


ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Eight Mahon Power Operated Rolling Steel Doors installed in track openings of a Diesel locomotive service shop. In addition to these, five Mahon Automatic Underwriters' Labeled Rolling Steel Fire Doors are installed in openings of interior walls. Rock Island Lines, Archts. and Engrs., S. N. Nielsen Co., Gen. Contrs.

MAHON

No costly maintenance problem here



Clean, trim-looking Johns-Manville Corrugated Transite side walls used on this modern factory building will provide years of maintenance-free service.

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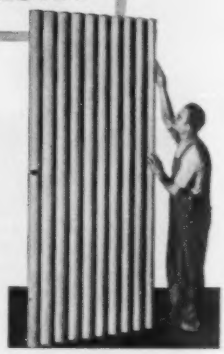
YOU SAVE MONEY on construction and maintenance when you build with Johns-Manville Corrugated Transite®. Corrugated Transite comes in large sheets that require a minimum of framing . . . permit fast, economical construction of industrial, commercial, institutional and agricultural buildings.

Made of asbestos and cement, Corrugated Transite is practically indestructible. It never needs paint or special treatment to preserve it . . . it's fireproof and rotproof. Corrugated Transite is also used increasingly for interiors. The streamlined corrugations and attractive shadow lines offer interesting design possibilities.

Investigate Johns-Manville Corrugated Asbestos Transite and learn how you can build quickly and easily . . . have an attractive, long-lasting, trouble-free structure regardless of size or purpose. For complete details, write Johns-Manville, Box 158, Dept. RA, New York 16, New York. In Canada, write 565 Lakeshore Road East, Port Credit, Ontario.



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- **Complete CRC (Centralized Radio Control) System for main line radio operation**
- **64-Volt communications unit for railroad radio that eliminated costly converters**
- **Lightweight, two-channel, 1-watt portable communications unit**

. . . and now another first

New AAR Standard dual-vibrator 64-volt single package communications unit

Here's the latest advance by Bendix* in the field of railroad radio. It's the brand new 1R54-C 64-Volt Dual-Vibrator Communications Unit.

And like all Bendix railroad radio equipment it exceeds AAR specifications for performance and operation. It combines receiver, transmitter and dual-vibrator power supply in one compact case. It operates directly from the locomotive 64 VDC battery supply and eliminates the use of costly converters. Railroad engineered from chassis to cabinet, it features *automatic change-over to stand-by vibrator;* new *transistorized* audio circuit that doubles audio output while keeping power drain at a minimum; and unitized plug-in chassis construction for easy servicing.

The 1R54-C represents another milestone in the progress of railroad radio—pioneered and developed by Bendix Radio. For complete details and specifications about this great new railroad communications unit, write Bendix Radio, Railroad Sales, Baltimore 4, Maryland.

*Reg. U.S. Pat. Off.

Bendix Radio

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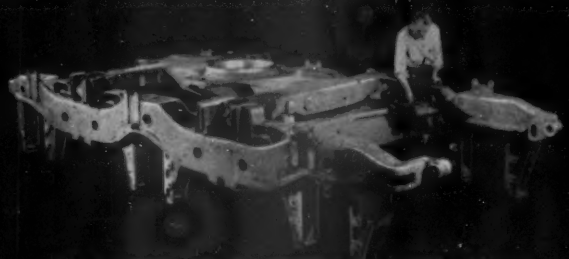

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THE L. F. M. DIVISION
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84 YEARS OF RAILROAD KNOW-HOW. READ THE LFM STORY

If you have not received your copy please address Atchison, Kansas, offices.

LEFT: This is all that remained after a wall of water swept away a 100-year-old stone arch bridge on the Erie's mainline near Shohola, Pa., as a direct result of Hurricane Diane.

from blueprint to finished bridge in 9 days!

How American Bridge helped the Erie RR meet the emergency of disastrous Diane.

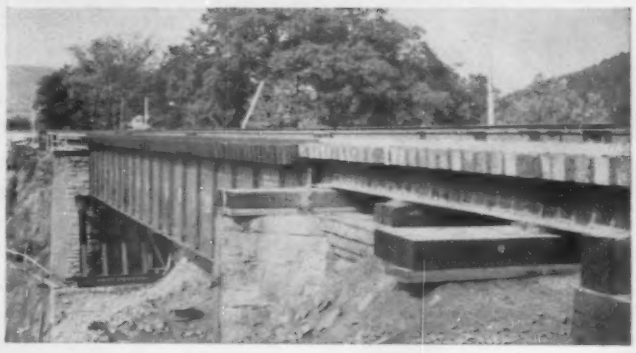
When Hurricane Diane's floods swept down the Delaware Gorge in August 1955, among the many washed-out bridges was the 100-year-old stone arch on the mainline of the Erie Railroad over Panther Creek at Shohola, Pa. *The wreckage was so complete that restoration seemed months away.*

Alerted to the emergency, American Bridge engineers, cooperating with the Erie's engineers, were on the job after the flood. An inspection of existing foundations revealed that they were adequate to support a modern steel girder bridge.

Verbal orders and specifications for replacement plans were received at the Ambridge works of American Bridge on August 31st. The fabricating shops were ready to begin work when the blueprints arrived two days later, although some of the steel for the 50-ton girders was yet to emerge from the open hearths and rolling mills.

Using every means at its command to speed fabrication, American Bridge was able to ship the two 109-foot girders in a record 8 days. The job was completed at the site at 8 A.M., Saturday, September 10th, thus enabling the Erie Railroad to resume traffic over its mainline in just 9 days after American Bridge first received specifications for the big girders.

Here again is another example of how American Bridge serves the railroads. Whether you are in trouble or not, it will pay you to call us in on your bridge fabricating and erecting requirements.



INTERESTING MOTION PICTURES AVAILABLE—"Building for the Nations" and "The Suspension Bridge," two entertaining and educational films, are now available without charge to business, fraternal, and civic organizations, churches, schools and colleges. Write to Pittsburgh office for bookings.

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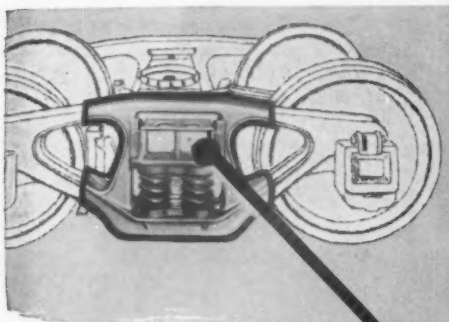
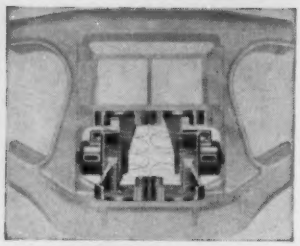
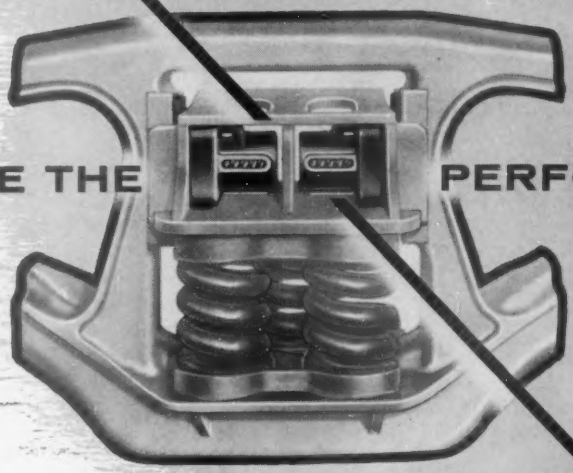


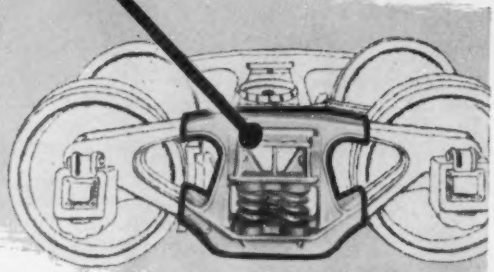
Conventional Freight Car Truck with Long Travel A.A.R. All-Coil-Spring Group and Unit Snubber.
(See illustration below*)



NEW HOLLAND
RIDE STABILIZER PACKAGE
Pat. Pend.



BRIDGE THE PERFORMANCE GAP



Modern High-Speed Freight-Car Truck

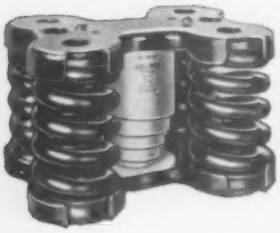
with NEW HOLLAND RS-1

RIDE STABILIZER

FOR EXISTING FREIGHT-CAR EQUIPMENT

The appreciable "performance gap" that has often been noted, between conventional freight car trucks with A.A.R. long travel all-coil-spring group with unit snubber, and freight car trucks with built-in bolster control, is now successfully-bridged.

The new Holland RS-1 Ride Stabilizer, a simple unit of radical but proven design, is easily applied to conventional type trucks and gives them riding qualities comparable to the modern high-speed trucks recently tested by the A.A.R. Write for Bulletin No. 16A for complete technical details.

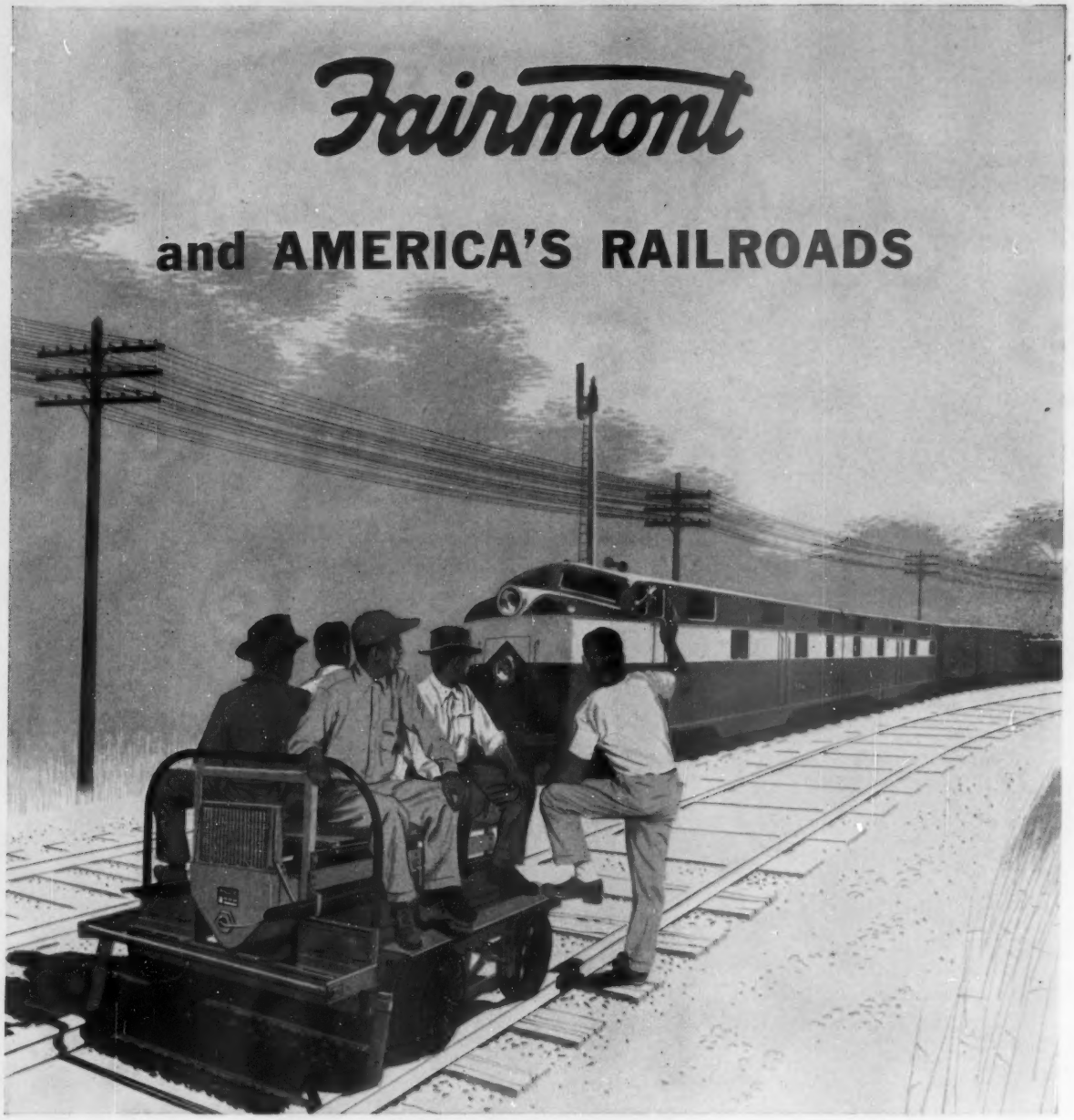


2½" Travel Spring Group with Unit Snubber
Also with 1⅝" Travel

777LC

HOLLAND COMPANY

332 South Michigan Avenue • Chicago 4, Illinois



. . . building together for the future!

We, at Fairmont Railway Motors, are proud to salute the railroads of America for their constant and untiring efforts to improve and expand their services. Their accomplishments are truly in the American heritage of enterprise, vision and pioneering instinct. The daily well-being of American business —and of the American people—will become increasingly better because of these transportation advancements.

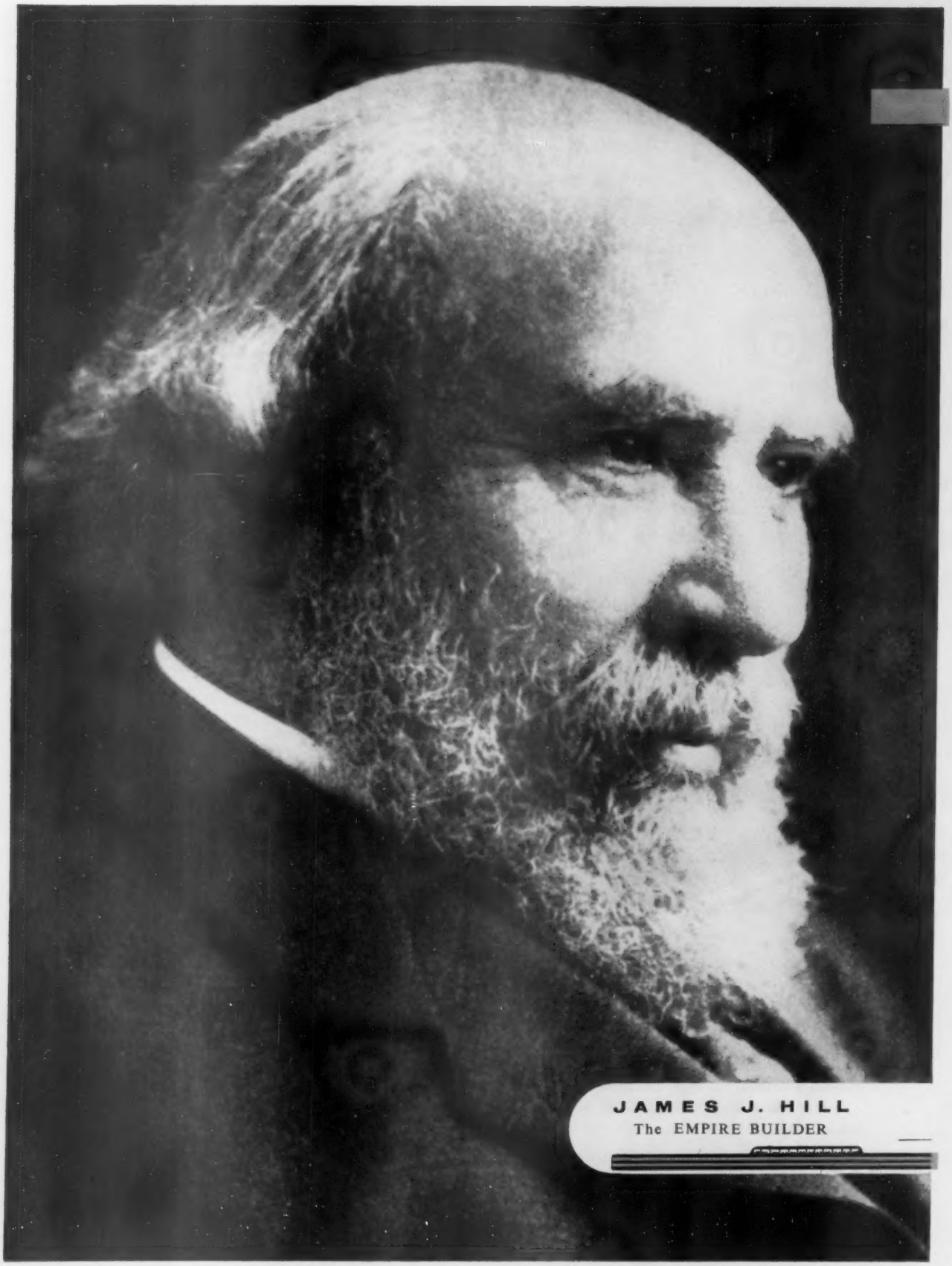
We are proud, too, of the part we have been privileged to play in this continuing program of growth and modernization. And, we are looking forward to making contributions of even-greater importance in the future.

Several new, time- and money-saving pieces of equipment are now under test or being developed . . . our engineers are available for field consultation at any time . . . and we are most happy to work directly with railway maintenance staffs.

If you have a specific problem—look first to Fairmont!

FAIRMONT RAILWAY MOTORS, INC., FAIRMONT, MINNESOTA

MANUFACTURERS OF INSPECTION, SECTION AND GANG CARS, HY-RAIL CARS, MOTOR CAR ENGINES, PUSH CARS AND TRAILERS, WHEELS, AXLES AND BEARINGS, BALLAST MAINTENANCE CARS, DERRICK CARS, OIL SPRAY CARS, GROUTING OUTFITS, TIE RENEWAL EQUIPMENT, RAIL RENEWAL EQUIPMENT, WEED CONTROL EQUIPMENT.


JAMES J. HILL
The EMPIRE BUILDER

100 YEARS AGO

A Giant Dreamed . . . and Built an Empire

One hundred years ago James J. Hill, a youth of 18, arrived in St. Paul. His hopes were bent toward the Pacific Ocean and the Orient, but he missed an oxcart caravan and stayed to build a mighty railroad empire.

No observance of a railroad centennial can be complete without the re-telling of the story of the man who came to be known as the Empire Builder.

The young dreamer, whose vision encompassed the sparsely inhabited lands along the northern part of the nation, spent some 30-odd years restlessly and energetically laying the foundation for Great Northern Railway. By 1890, after years of painstaking work, the Great Northern, born of the Minneapolis and St. Cloud Railroad and the St. Paul, Minneapolis & Manitoba Railway, was 3,260 miles big.

Out at the westernmost end of the Great Northern, the Rocky Mountains loomed large on the horizon. And beyond lay Puget Sound, the Pacific Ocean, Alaska and the Orient of Jim Hill's boyhood dreams.

Hill began punching his line from Havre, Montana and over the spine of the Rockies in 1890. By January, 1893, the last spike was hammered home at Scenic, Washington; and, in midsummer, Seattle and the East were linked by regular, direct rail service.

The Empire Builder had completed the steel skeleton of his domain . . . an empire rich in all manner of things except people to make it go and grow. Hill had an empire to sell; and, laboring long and hard to create traffic for his railway, he stumped vigorously and successfully for human settlement.

As sod was turned and timber felled, Hill urged farsighted agricultural concepts—soil conservation, crop rotation, diversification on farms. He imported the first purebred livestock into the empire and strove diligently to make the land prosper for those who worked it. Jim Hill said: "The railroad is in partnership with the land upon which we live and walk—it will prosper only when the land prospers or the owner prospers."

Just as Hill predicted, both the land and the railway prospered. Today the area served by Great Northern is wealthy in terms of agricultural and mineral resources, growing in industrial might as well. And, as the region has expanded its economy, so its principal railroad has grown. Today Great Northern Railway stands as a pulsating, vigorous monument to its founder.

A century is a long time—time for many changes. So, Jim Hill would blink his eyes in amazement at the transformation that has occurred to his "empire" in the 40 years since his death. But he would be certain to recognize the same indomitable spirit, the same faith in the region's future, the same dedication to swift and dependable transportation that he himself engendered as he built Great Northern in the first place.

Today's EMPIRE BUILDER is this luxurious Streamliner in daily service between Chicago and Seattle-Portland.

GREAT NORTHERN RAILWAY

With ever-widening business horizons, this year as in the past, an increasing number of progressive companies are moving ahead with Railway Express.

To keep pace with the growing demands of these alert shippers, Railway Express has initiated a $70,000,000 expansion program involving new trucks and trailers, new refrigerator rail cars, and new materials handling equipment.

And, with industry expanding its operations beyond the limits of the United States, Railway Express has instituted a service to foreign countries. Now, to serve the needs of this industrial expansion with characteristic speed and dependability, Railway Express is offering an overseas service to 106 different countries.

It's all part of the moving picture . . . continuing the highest standards of transportation efficiency which Railway Express has maintained for over 117 years.

Moving into **TOMORROW**

1913

1925

1935

1945

How **43 YEARS OF PROGRESS** by Ingersoll-Rand has made TIE TAMPING TODAY faster, easier and more economical than ever before

Remember when tie tamping used to be a slow, laborious, back-breaking job – done entirely by sheer muscle power? Thanks to Ingersoll-Rand, those days are gone forever.

The first railroad compressor (now reposing in the Smithsonian Institute) was introduced by Ingersoll-Rand in 1913 – and with it, the first air-operated tie tamper. This I-R air-power team revolutionized tie tamping almost overnight. Air tamping not only did a far better and more uniform job – it actually cut tie tamping time in half!

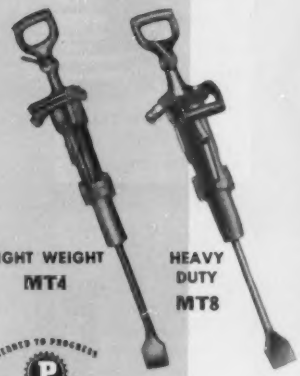
Since 1939, tremendous progress has been made in railroad compressor equipment. Today, modern rail- and rubber-tire mounted Gyro-Flo rotary compressors, in 85, 125, 210, 315, 600 and 900 cfm sizes, represent the very last word in large-capacity portable units for maintenance of way service. With no compressor pistons, rings, rods or valves, it has been acclaimed as the most maintenance-free compressor ever developed.

And for a four-tamper crew, the Ingersoll-Rand Spot-Air compressor gives you a completely self-contained, 36-cfm, 80 psi air power plant that weighs only 265 lb. complete. You can set it just about anywhere, and with wheelbarrow mounting, moving it around is an easy, one-man job. For the whole cost-saving Spot-Air story, send today for your copy of Bulletin 2264B.

1956
RAIL MOUNTED GYRO-FLO

1956 SMALL, LIGHT-WEIGHT SPOT-AIR COMPRESSOR
operates four Tie Tampers

MODERN I-R TIE TAMPERS



LIGHT WEIGHT MT4

HEAVY DUTY MT8

DEDICATED TO PROGRESS
PRI MEMBER

Ingersoll-Rand

11-449 11 Broadway, New York 4, N. Y.

COMPRESSORS • CONDENSERS • AIR & ELECTRIC TOOLS • TURBO-BLOWERS • PUMPS • ROCK DRILLS • GAS & DIESEL ENGINES

Congratulations to RAILWAY AGE on its hundredth anniversary of service to our country's railroads.

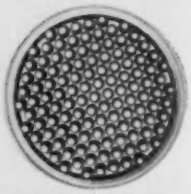
Like RAILWAY AGE, our interest in railroading is communication. Our contribution is the lenses that speak the colorful language of signals. AGE communicates the happenings of interest and importance to all railroaders.

CORNING® Optical-Type Lenses

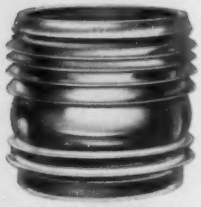
CORNING® Spredlite® Lenses

CORNING® Doublet Lenses

CORNING® Roundels



CORNING® Reflex Lens



No. 250 Fresnel Globe

CORNING GLASS WORKS

CORNING, N. Y.

Corning means research in Glass

LOW OVERHEAD

—with pressure-creosoting!

There's no substitute for *pressure-treatment* with Barrett Coal-Tar Creosote. It gives you big cost-cutting advantages wherever you use wood—for cross-ties, railroad car lumber, freight platforms, road crossings, piling. The dependable wood-preserving properties of Barrett Creosote have been *time-proved* under actual operating conditions . . . railroads report their pressure-creosoted wood lasted up to 6 times longer than untreated wood. That's because Barrett Creosote stops rot, fungi and insects—the principal causes of early wood failure. Cut your replacement costs to the bone: specify pressure-treatment with Barrett Creosote.

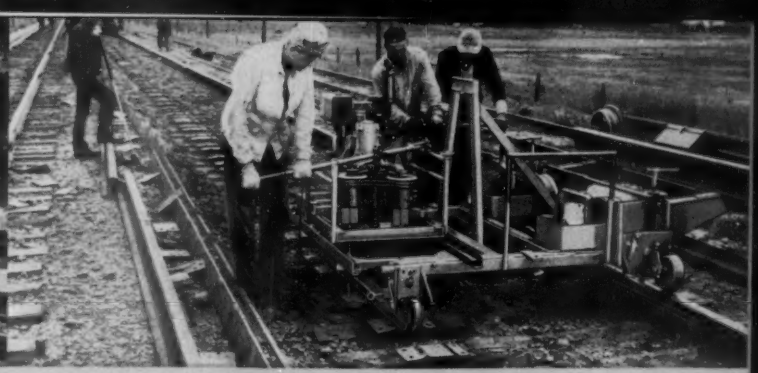
Best wishes from one centenarian to another

BARRETT CREOSOTE

BARRETT DIVISION, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y.

OVER 100 YEARS OF EXPERIENCE

CRIBEX® . . . Employing an endless chain of digging flights, the Cribex removes material contained in the cribs and deposits it beyond the ends of the ties. It leaves a smooth and uniformly graded crib floor, completely emptying crib without damage to ties or rails.



DUN-RITE® GAGING MACHINE . . . Fast and accurate, the Dun-Rite base gaging method fastens the tie plates to the tie in exact position so that when the rail is placed the head to head gage is correct.

In the Future . . . as in the Past . . .

Nordberg *"Mechanical Muscles"*® will continue to do a Better Maintenance job . . . Faster . . . and at Lower Cost

From the time the first Nordberg Track Maintenance Machine was introduced over a quarter-century ago to the present day . . . America's leading railroads have made Nordberg *"Mechanical Muscles"* the standard by which modern maintenance machinery is compared.

Now, more than twenty-five different Nordberg Track Machines are in daily use . . . all designed, built, tested and proved with the cooperation of railroad men. This is positive evidence of progress and constant assurance that Nordberg will continue to serve you better with an ever increasing line of dependable maintenance machines.

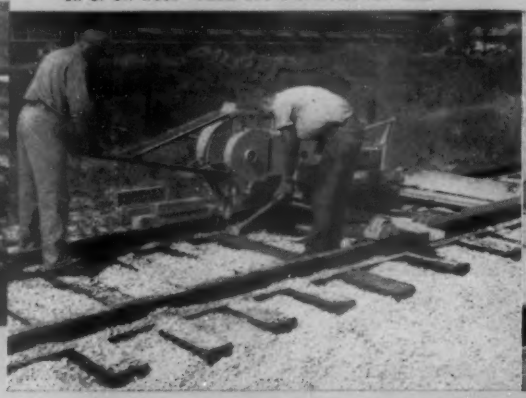
Write for literature on any or all of these money-saving Nordberg "Mechanical Muscles."

© 1956, Nordberg Mfg. Co. R1355-R

HYDRAULIC SPIKE PULLER . . . Simple, versatile machine for tie removal, switch and bridge timber jobs—quickly and economically pulls spikes on either rail.

GANDY—TIE PULLER AND INSERTER . . . A multi-purpose self-propelled, on-track machine that pulls old ties—inserts new ties—loads old ties, sets machines on or off track—hauls and distributes new ties.

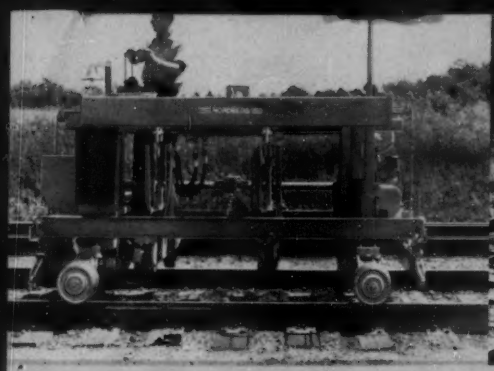
AUTOMATIC GANG TAMPER . . . Operated by one man, this machine assures uniform quality tamping of every tie, every time, in any ballast, whether raising or spot surfacing.



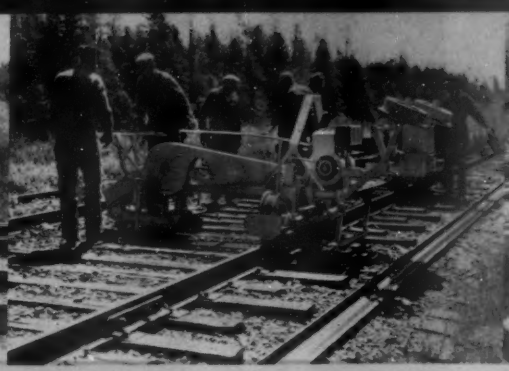
SPIKE HAMMER . . . A power machine that drives spikes straight and to correct depth. One machine can drive 800 spikes per hour.

TAMPING POWER JACK . . . Operated by one man, this self-propelled machine efficiently raises track and tamps key ties at lifting points.

NORDBERG MFG. CO.



TRAKLINER . . . A self-propelled machine for faster, more accurate track lining in raising, spot surfacing, new work or improvement programs. One man and a machine do the work of 14 men or more.



BALLAST ROUTER . . . Easily and quickly removes high crib ballast, improves track drainage, and simplifies application of rail anchors.

ADZING MACHINE . . . Properly prepares tie seats in keeping with today's track maintenance standards. Adzer is easily operated and adjusted without tools. All tie seats are uniform and in same plane.

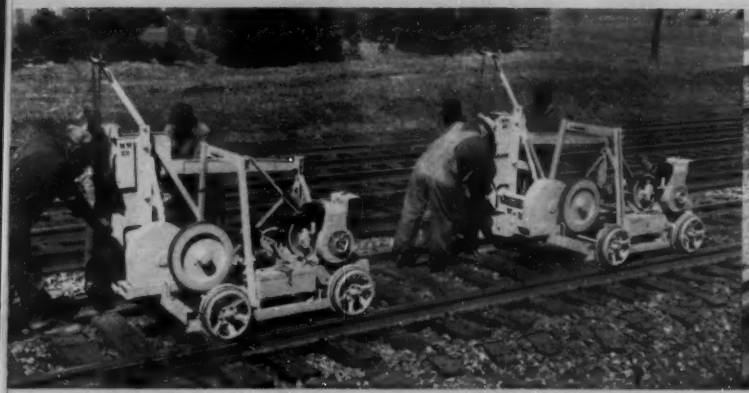
TIE DRILL . . . For speeding rail laying, reducing field tie drilling costs and increasing life of ties . . . drills 2 holes at once in less than 3 seconds per hole.

POWER JACK . . . Speed, accuracy and ease of handling on or off the track are advantages of this machine for reballasting, general surfacing and all other operations involving raising of track.

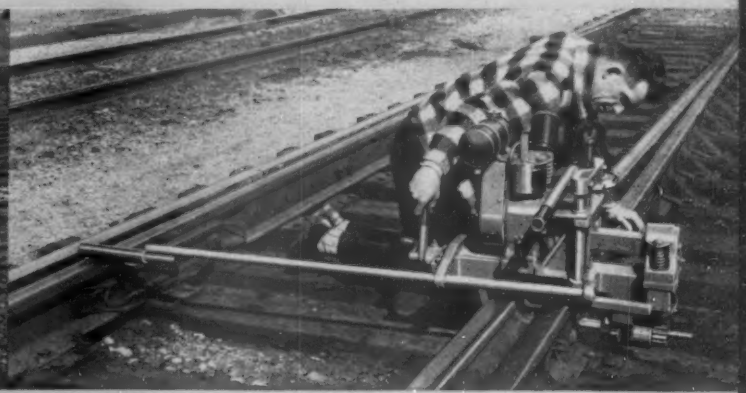
POWER WRENCH . . . Provides uniformly controlled tightening of track bolts. Machine is operated by one man and is ruggedly built to take hard service, yet light in weight to be easily handled off and on the track.

BALLASTEX®—SCREENEX® . . . A fast, economical machine combination that excavates ballast between tracks or on shoulder, cleans and returns it to track, intertrack, or shoulder.

RAIL GRINDERS . . . For reconditioning rail, switches, frogs and crossings, Nordberg builds four types of grinders. In this selection you will find the grinder best suited to your requirements.



MECHANICAL SPIKE PULLER . . . Three men and machine easily pull from 30 to 45 spikes per minute, speeding up relaying and reducing the cost of the entire operation.



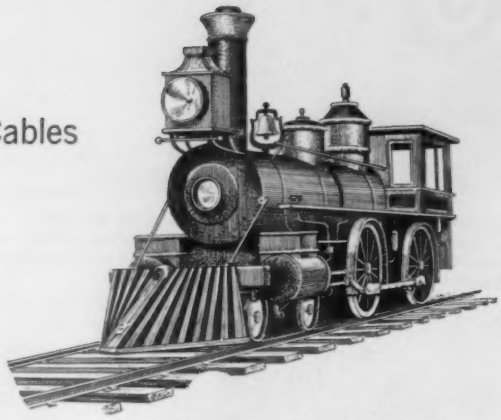
RAIL DRILL . . . A compact, lightweight 1¾ hp drill that is easily set up and adjusted for accurate work and easily moved from job to job. Self-tightening chuck is simple and the bit is positively held.

Milwaukee, Wis.

NORDBERG

"Mechanical Muscles"®

Electrical Wires and Cables



This locomotive was the finest of its type back around 1890, the year "U.S." began making electrical wires and cables to serve the growing railroad industry.

In step with America's Railroads ever since the single gauge came in...

Year by year, America's railroads become more and more dieselized and electrified. That steps up the demand for electrical wires and cables. But it also means that manufacturers have to turn out wires and cables of tougher specifications, greater durability, wider versatility. The tremendously complex centralized traffic control systems and other "push-button" devices need the finest wires and cables obtainable.

United States Rubber is right in the middle of this tremendous railroad electrification growth. For 66 years "U.S." has been supplying railroads with the wires and cables required—as well as *anticipating* future demands. "U.S." has gone along side by side with the railroads, as they grow into an ever stronger national transportation system —a system unmatched in economy, efficiency and safety.

"U.S." is the only wire and cable manufacturer growing its own natural rubber, making its own synthetic and plastic compounds. Through this unequaled *control of manufacture*, "U.S." can always guarantee *superior insulation* in every type of wire and cable it produces.

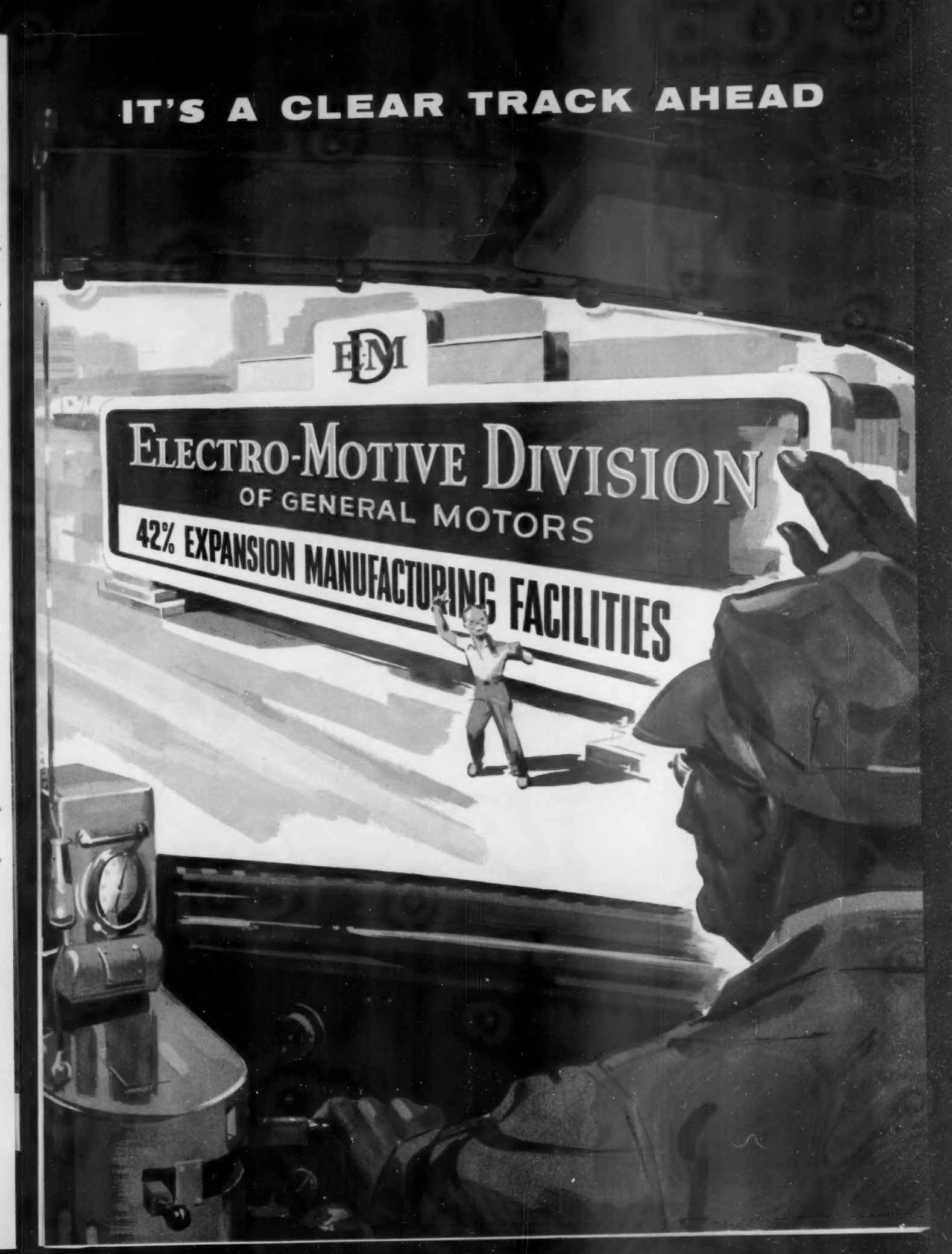
Electrical Wire & Cable Department, U.S. Rubber, Rockefeller Center, New York 20, N. Y.

Above is the United States Rubber wire and cable factory in 1890. Below (left) as it looks today.

Just as this up-to-the-minute Diesel typifies the advancement in locomotion, so also "U.S." electrical wires and cables typify leadership in their field, as they have for 66 years.

Electrical Wire & Cable Department

United States Rubber


IT'S A CLEAR TRACK AHEAD
EMD
ELECTRO-MOTIVE DIVISION
OF GENERAL MOTORS
42% EXPANSION MANUFACTURING FACILITIES

1
2
3
4
5

Why is Electro-Motive expanding manufacturing facilities 42% at La Grange?

According to the best projected census and economic growth figures available, if the railroad industry only maintains its *present* share of the total passenger and freight business in this country, there will be forty per cent more passengers and ton-miles to be hauled by American railroads in 1966. And there are many signs that the railroads' share of the total market could rise well above this figure.

By expanding facilities now, Electro-Motive will be in a position to serve you better, to help you anticipate your increasing motive-power requirements, keep pace with the demands of an expanding economy.

Thus, whether it's new and ever better standard locomotive units, re-manufacture and upgrading of older units, research and development of entirely new engines and other railroad products, Electro-Motive is in a better position than ever to support your position in the transportation field. It's our way of saying, "We have great faith in your future".

1 BASIC MANUFACTURING AREA

Over 17,000 Diesel-electric units have been produced in the plants of Electro-Motive. Today, they are operating 20 million switcher yard-hours, hauling almost 2 billion passenger train-car miles and nearly 900 billion ton-miles every year.

2 LOCOMOTIVE RE-MANUFACTURE

Pioneered by Electro-Motive, this new service is saving the railroads millions of dollars in reduced operating costs by upgrading horsepower ratings and general complete modernization.

3 PARTS CENTER

This complete warehouse stock services the other six warehouses and serves as a Midwest warehouse also. These complete facilities have been designed and enlarged to help you keep your motive power operating at top efficiency all the time.

4 RESEARCH AND DEVELOPMENT CENTER

From the time the first Diesel became a reality, this facility has worked tirelessly to bring the General Motors Diesel-electric to the brilliantly engineered piece of equipment it is today. More improvements, more new products are on the way.

5 NEW MANUFACTURING FACILITIES

This represents the new investment in our future, so closely allied to yours. In this way, we insure the extension of our program of continuing high quality and improvement, new design, better services to the nation's railroads.

How we invest in your future with new and improved products

Since the first practical application of the General Motors Diesel locomotive, horsepower ratings have averaged a 33% increase, traction motor life before rebuild has been more than quadrupled, traction motor ratings are increased almost one-third. These are but a few of the hundreds of continuing improvements that are the product of our research and development facilities.

In addition to the continuous program of upgrading our present line of Diesel engines, we feel that it is our obligation to the industry that a program of basic research in new engine types be maintained. Such a program may result only in improvements in current engine types, or it may result in new units that will supplement present engine models. Past history would indicate that regardless of the form these developments may take, the result is progress. And the ultimate result is improved railroad service.

Railroad Development Projects

As we became more closely linked with the railroad industry, our engineers directed their efforts to additional projects that were to offer the opportunity for still better service by American railroads. On these pages you will see just a few of them.

The Aerotrain

Electro-Motive developed this train as an answer to the problems of high-cost uneconomical passenger traffic. It is *not* a luxury train, but one which is competitive in comfort and cost to many other forms of mass transportation. Thus it offers the opportunity to regain much lost passenger business while reducing fares and operating losses. Several railroads have already reported success on initial test runs.

The "Frigifrater"

This new mechanically-refrigerated railroad car requires little servicing, maintains any temperature between 10 degrees below zero and 65 above. Defrosting cycles are materially reduced, loading and unloading is greatly simplified through the use of fork lift trucks, with no increase in refrigeration loss. Moreover, a special type of insulation adds to the structural strength of the car. It will not pack down or absorb moisture, thus corrosion of hidden steel surfaces is prevented.

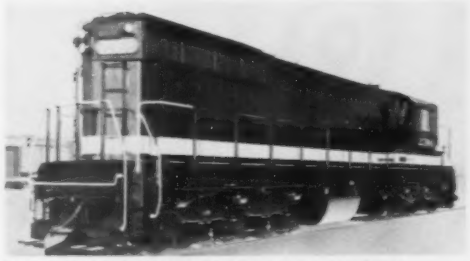
Trailer Transport Car

Through the Rail Highway Coordination Program, Electro-Motive has developed this special purpose car which will carry two fully-loaded 35-foot semi-trailers. This 75-foot car, designed to meet the uniform clearance diagram for all railroads, can be easily loaded and unloaded with a specially designed fork lift truck. An additional part of this program includes the designing of terminal facilities that will best lend themselves to the coordinated movement of trailers on these cars.

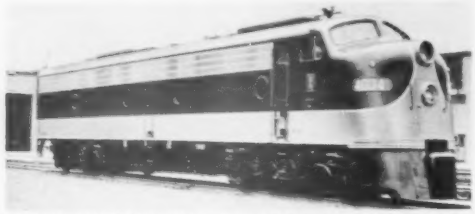
F9 FREIGHT OR HEAVY-DUTY PASSENGER UNIT. Eight different gear ratios permit an unusually wide range of services for varying conditions on this great 1750-hp combination freight and passenger locomotive.

The right size for every service

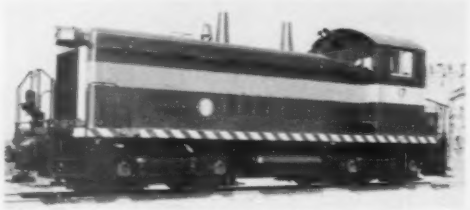
For over twenty years Electro-Motive has experimented with many various sizes and types of Diesel-electric units. Many of these, after testing, have been rejected as impractical or unsuitable to railroad service. Others have been incorporated into the standard line, refined and *re*-refined. The result is a complete line of Diesel-electric units built to standardized specifications that can answer every service requirement in railroad operations.



SD9 SPECIAL DUTY UNIT. The improved 6-motor road switcher is ideally suited to light rail conditions where axle loading is limited and heavy tonnages prevail. Horsepower is now 1750, and axle loading can be as low as 50,000 lbs.

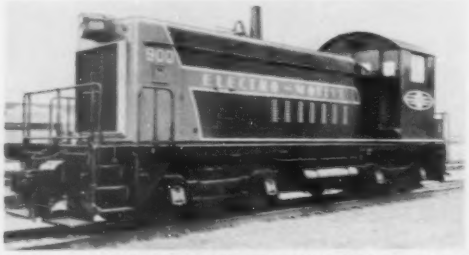


E9 PASSENGER UNIT. Here is the improved version of the locomotive that hauls an overwhelming majority of America's fastest trains. Now up to 2400-horsepower, the feature of double dependability is retained with two engines per unit.



SW1200 125-TON SWITCHING UNIT. Powered by the 567C, 1200-hp engine, this improved switching unit also has the high-rated D-37 traction motor, sealed gear case and simplified six-year maintenance-free control apparatus.

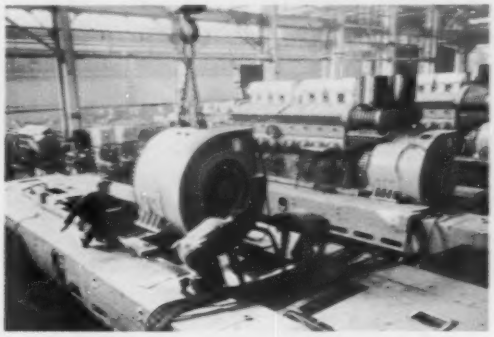
GP9 GENERAL PURPOSE UNIT. This 1750-hp unit meets the wide-range requirements of service on branch and secondary lines as well as main line operation. It offers the opportunity for even greater earning power than its hundreds of predecessor units.



SW900 115-TON SWITCHING UNIT. This 900-hp switcher will do all the work ordinarily assigned to switchers in the 1000-hp class, with considerably lower initial investment and lower operating costs. Most parts are interchangeable with other General Motors units.

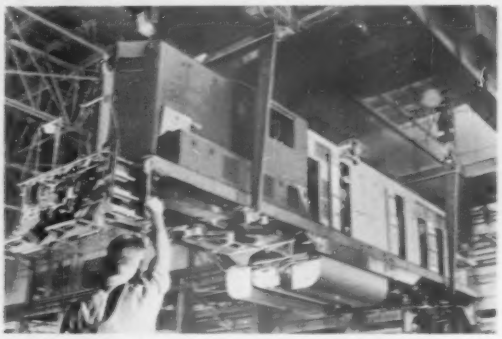
Upgrading provides all the qualities of a new locomotive

You have the opportunity to supplement orders for new units with a program of having your older units upgraded by Electro-Motive. Many roads have already embarked on such a program of modernization, with specific plans for a given number of units to be upgraded every year. For instance, shown above, is an older unit as it was shipped to us for upgrading recently.



In some cases, we replace the old car body and underframe, mounting a new generator on the completely new frame along with other new components.

In such cases, a completely new body is added,



the unit is trucked on completely re-manufactured trucks and traction motors. When all assembly work is complete, the unit is moved to the test area, and is tested and inspected as a new locomotive.

This virtually new locomotive carries the full warranty of a brand new Diesel, and is produced at considerably less cost than that of a new unit. There are almost as many varying types of conversions as there are basic units. Working jointly with you, we can help you determine the most economic type for your older locomotives.

How to plan ahead

The ten-year period just ahead is a crucial one for the railroad industry. The close of this period should reveal a clearly defined portrait of the share the railroads are to have in the transportation marketplace of the future. By every reasonable economic yardstick that can be applied to this ten-year period, the opportunities for growth are undeniable.

Already, we are cooperating with several roads who have measured this potential. Their conclusions are based on anticipating their equipment requirements well in advance of need. They are laying the groundwork involved through specific year-by-year order planning. Thus orders may be placed sufficiently in advance that deliveries of power will be made when power is required, not months or years later.

Thus, whether it be new locomotives, upgrading present motive power, parts and unit exchange planning or entirely new products, Electro-Motive is in a position today to help you plan now for a more rewarding tomorrow.

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

LA GRANGE, ILLINOIS • *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel, Ltd., London, Ontario

GENERAL MOTORS LOCOMOTIVES

to Stop weeds...

Borate weed killers are proving best for 'roads from every standpoint...*efficiency, safety, economy, conveniency, easy application.*

Pacific Coast Borax Company pioneered the use of borates for maximum control of vegetation. Continued research has developed a group of borate herbicides which are now effectively meeting every phase of Railroad weed control. Today most 'roads are using our weed killers, in preference to all others, for the year-'round maintenance of weed-free conditions about trestles, tie piles, yards, signals, switches and along the rights-of-way.

You will want to know how these herbicides can benefit you; a note to the office nearest you will bring full information. Better yet, ask for a personal discussion about your weed problems, with no obligation. Our sales force, technically trained, is well qualified to give you the most practical solution.

Pacific Coast Borax Company

DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS®

Weed Killers: BORASCU® · Concentrated BORASCU® · POLYBOR-CHLORATE® · UREABOR® · MONOBOR-CHLORATE®

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MISSOURI
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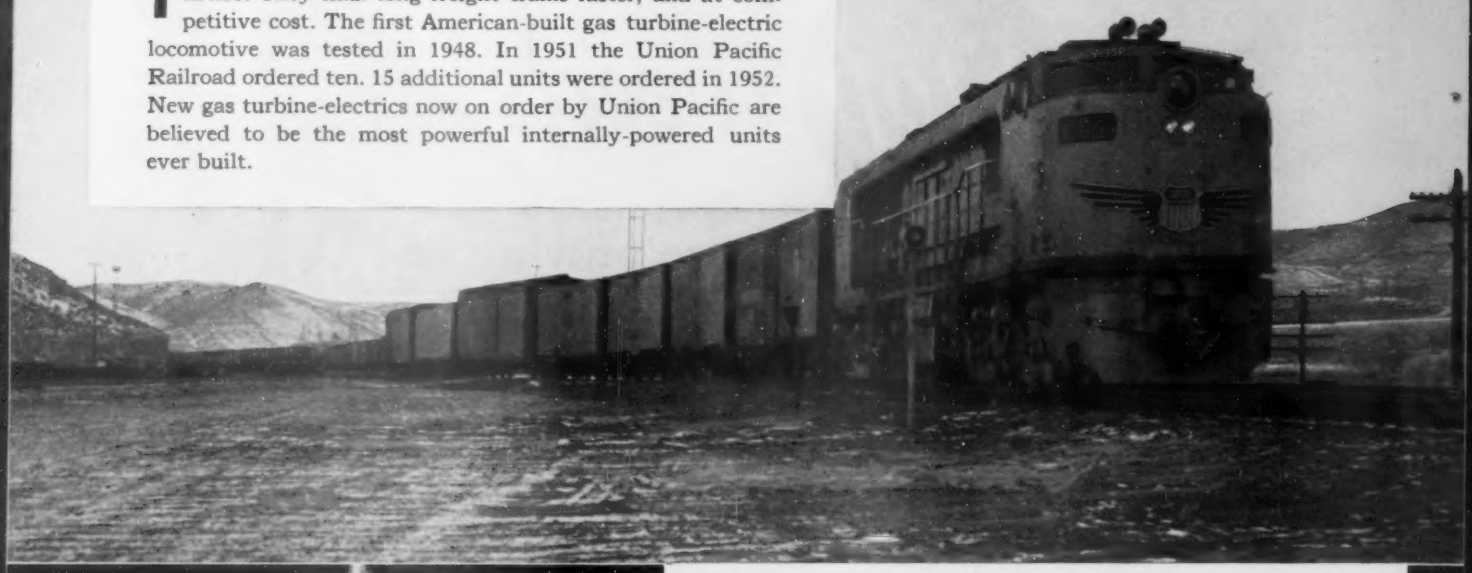
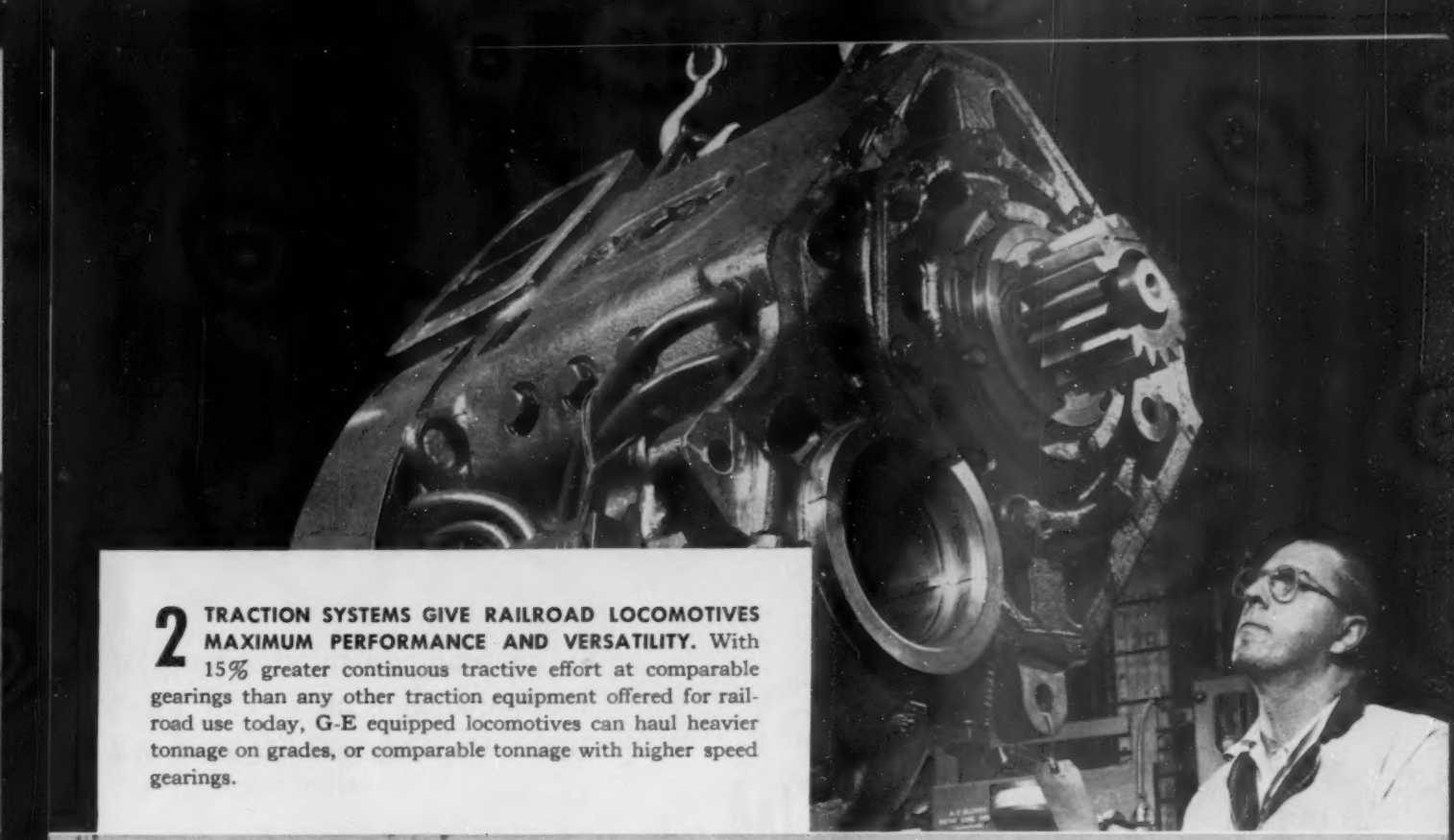
SEATTLE

1 GAS TURBINE-ELECTRICS BRING NEW POWER TO THE RAILS. They haul long freight trains faster, and at competitive cost. The first American-built gas turbine-electric locomotive was tested in 1948. In 1951 the Union Pacific Railroad ordered ten. 15 additional units were ordered in 1952. New gas turbine-electrics now on order by Union Pacific are believed to be the most powerful internally-powered units ever built.

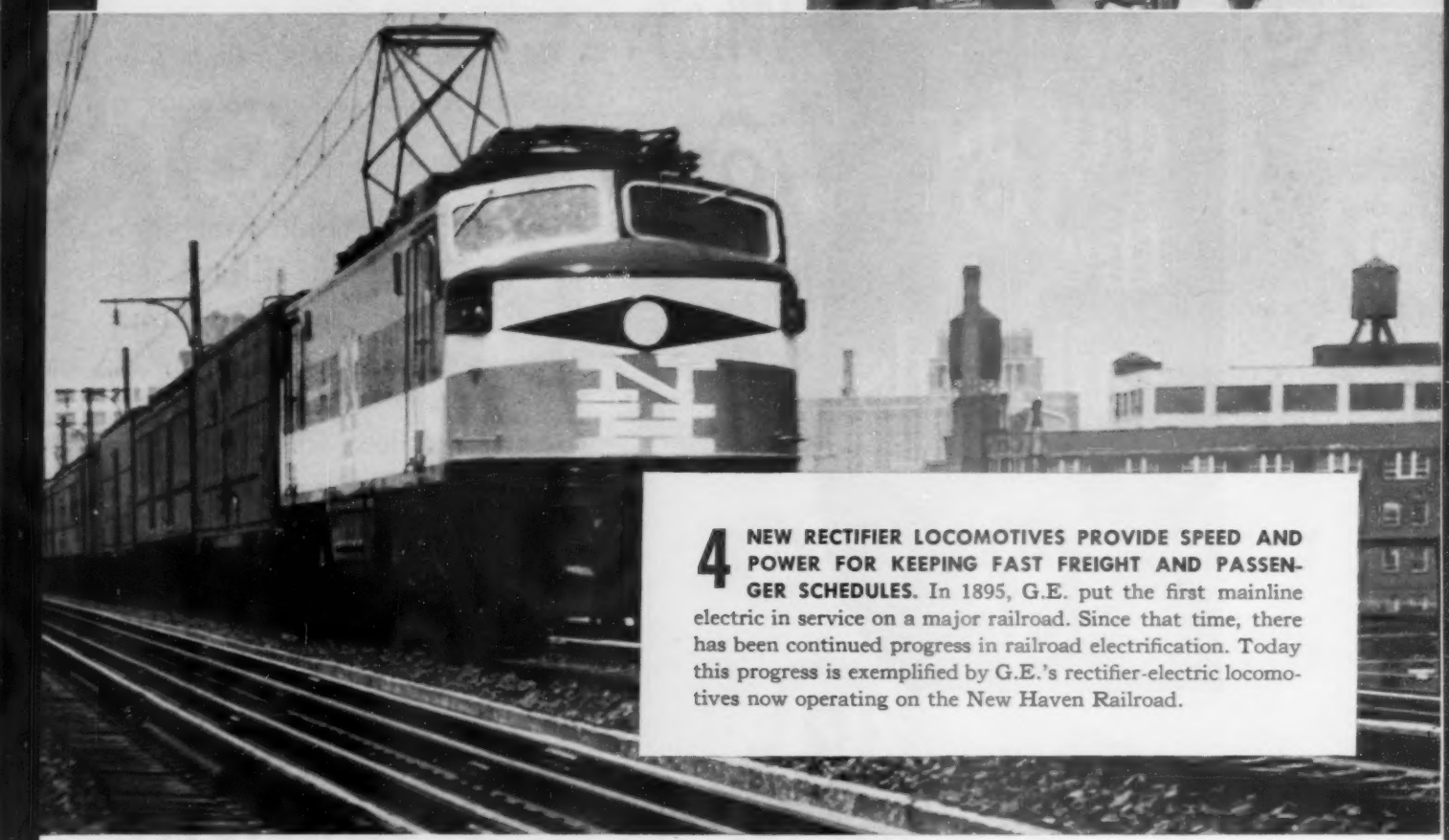


3 AXLE-DRIVEN MOTOR-GENERATORS HELP PROVIDE COMFORT AND CONVENIENCE ABOARD MODERN STREAMLINERS. G.E.'s undercar power supply has more reserve power than competitive equipment which means that it can make possible a better battery record, supply increased demand should axle generators on other cars become inoperative.

Four Examples of How General Railroad Progress with Electrical



2 TRACTION SYSTEMS GIVE RAILROAD LOCOMOTIVES MAXIMUM PERFORMANCE AND VERSATILITY. With 15% greater continuous tractive effort at comparable gearings than any other traction equipment offered for railroad use today, G-E equipped locomotives can haul heavier tonnage on grades, or comparable tonnage with higher speed gearings.



4 NEW RECTIFIER LOCOMOTIVES PROVIDE SPEED AND POWER FOR KEEPING FAST FREIGHT AND PASSENGER SCHEDULES. In 1895, G.E. put the first mainline electric in service on a major railroad. Since that time, there has been continued progress in railroad electrification. Today this progress is exemplified by G.E.'s rectifier-electric locomotives now operating on the New Haven Railroad.

Electric Promotes Pioneering

For more information, contact your G-E Apparatus Sales representative, or write Section 135-7A, General Electric Company, Locomotive and Car Equipment Department, Erie, Pa.

Progress Is Our Most Important Product

GENERAL ELECTRIC

It's gonna be a great day for the railroads

When

- Competition with other forms of transportation is on a "Fair Play" basis . . . making possible *increased revenues.*

- Increased revenues permit the purchase of freight cars on an *orderly, long-range basis.*

- Orderly buying results in mass production that saves the railroads millions upon millions of dollars in costs of expanded freight car fleets.

- Expanded fleets will provide still better service to customers, with cars available to meet peak traffic periods as well as potential defense requirements.

American

And a great day for the Independent Car Builders

When

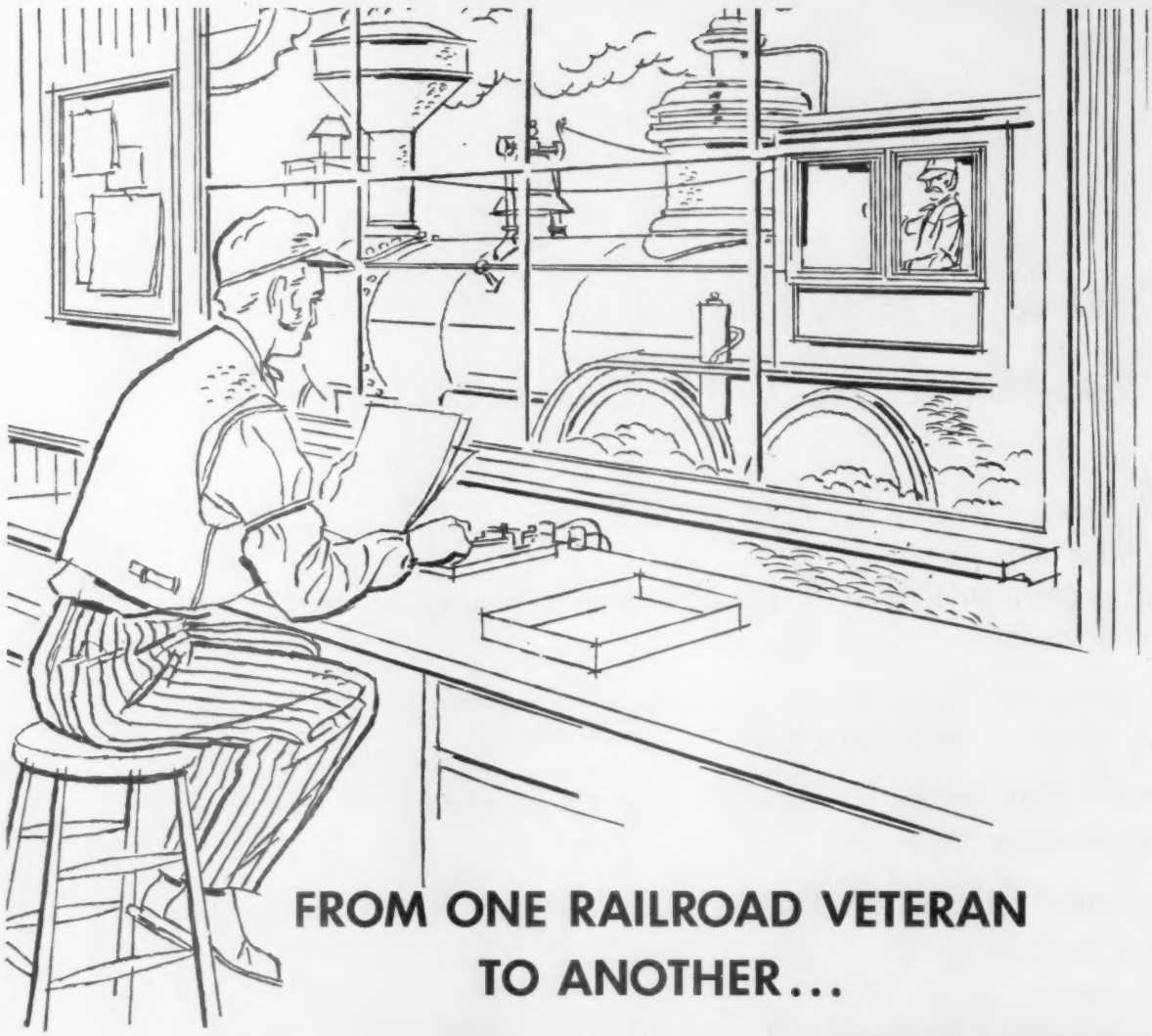
- More prosperous railroads can purchase more freight cars on an orderly, long-range basis.
- A steady backlog of orders will make possible maximum efficiency and the employment of a stable labor force.
- Greater standardization of design will permit still further cost reductions . . . more cars at less cost.
- Increased earnings will allow for greater research toward improved cars.

Yes, a great day

When

The railroads and the independent car builders are no longer treated as stand-by industries . . . but as two vital, inter-dependent segments of our transportation system.

Railway Car Institute



FROM ONE RAILROAD VETERAN TO ANOTHER...

CONGRATULATIONS

ON A SUCCESSFUL CENTURY OF SERVICE

WE WERE THERE when you were born. It has been our privilege to watch your continued growth and your outstanding contribution to the railroad industry during your first century of service.

Let's keep 'em rolling during your second century.

L&N

LOUISVILLE & NASHVILLE RAILROAD

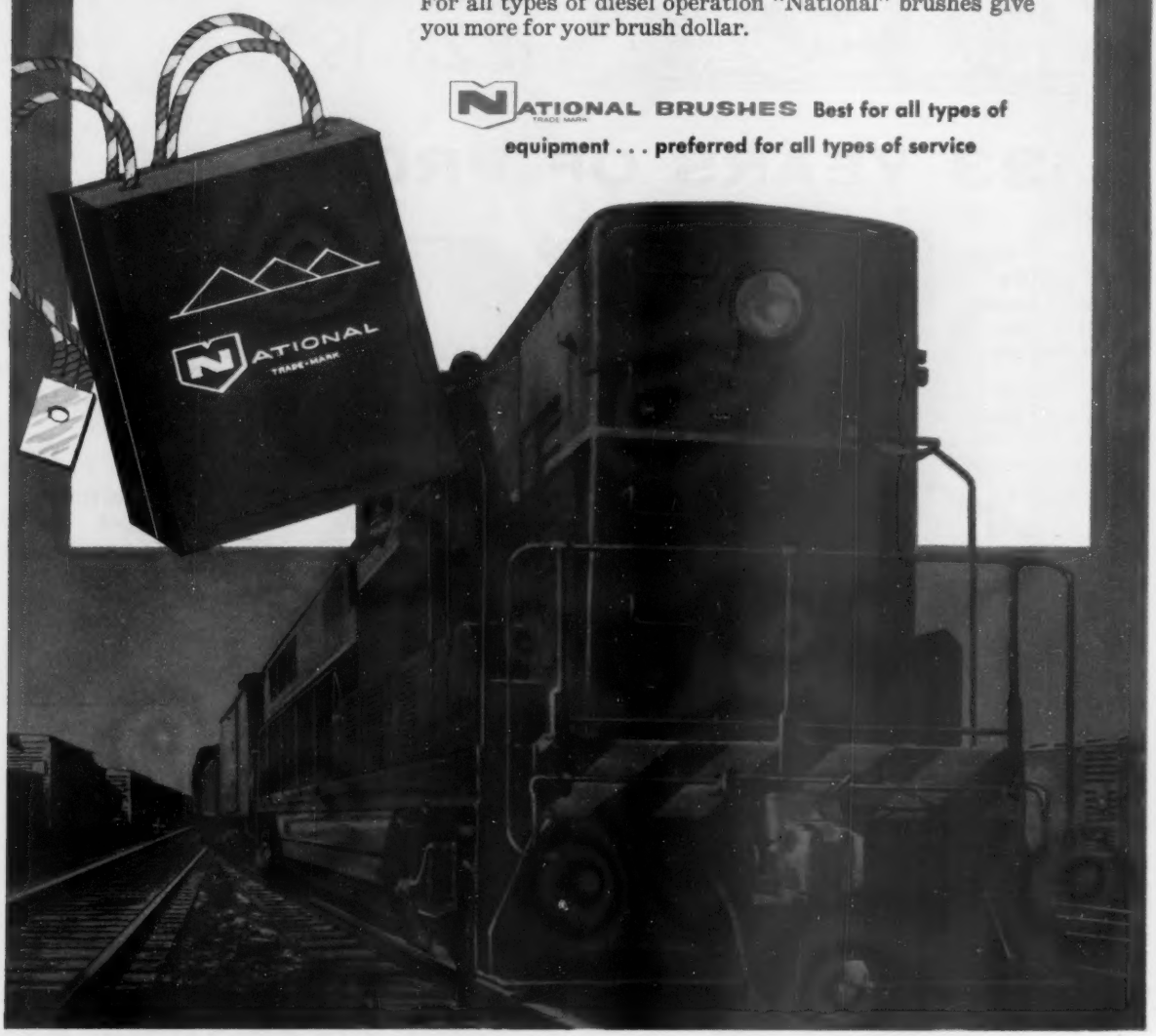
Why NATIONAL TRADE-MARK *brushes are best for diesel-electric switchers*

For the constantly varying service conditions of switcher locomotives, you need brushes with proven commutating ability. Here are some of the reasons why you can depend on "National" brushes:

- Healthy film keeps commutator in excellent condition for longer life.
- Top performance under varied loads—from idling to steep climbs with full load.
- High brush strength to absorb constant shocks from frogs, crossovers and switches.
- Millions of test miles go into the proving of each grade before it is offered for regular service.

For all types of diesel operation "National" brushes give you more for your brush dollar.

NATIONAL BRUSHES Best for all types of equipment . . . preferred for all types of service



The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY • A Division of Union Carbide and Carbon Corporation • 30 East 42nd Street, New York 17, N. Y.

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. *In Canada:* Union Carbide Canada Limited, Toronto

133 YEARS OF PROGRESS

Thirty-three years before the first edition of RAILWAY AGE was printed, "The President, Managers and Company of The Delaware & Hudson Canal Company" was chartered by the Legislature of the State of New York.

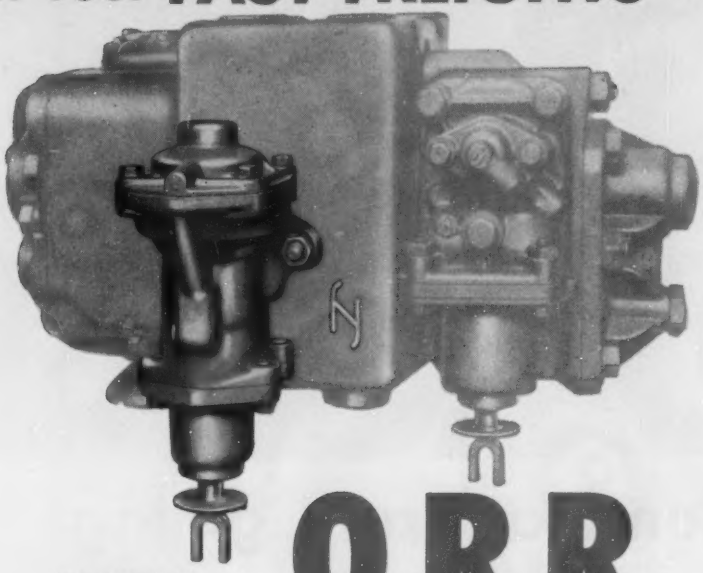
Six years later, on August 8, 1829, the "Stourbridge Lion", purchased in England by The D. & H., made its trial trip near Honesdale, Pa., thus being the first steam locomotive to be operated in America.

The history of The D. & H. is the story of the progress of American railroading. Today its giant diesels haul the commerce of two nations over its famous "bridge line", connecting the South and West with eastern Canada and New England.

The management of The D. & H. believes that the future welfare of the Nation is inseparable from the prosperity and progress of rail transportation. As in the past The D. & H. will be in the foreranks of those dedicated to this principle.

DELAWARE & HUDSON RAILROAD
CORPORATION

SPEED UP DEPARTURE of Your FAST FREIGHTS···

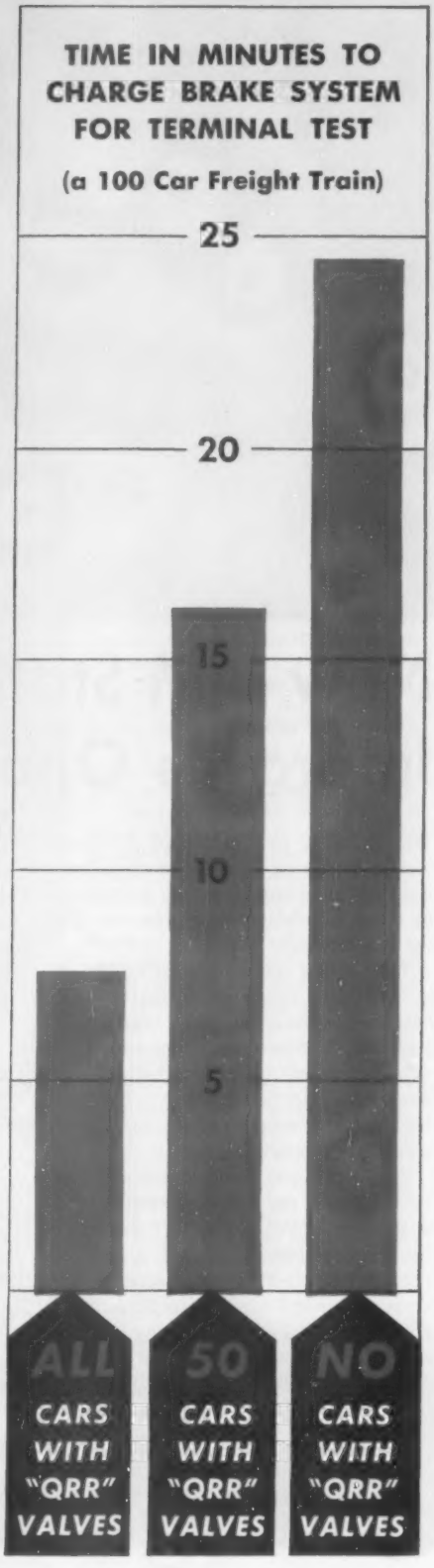


WITH... QRR BRAKE CYLINDER RELEASE VALVES

Save time required for Air Brake tests! With the "QRR" Brake Cylinder Release Valve, air stored in the "AB" Reservoirs is retained when cars are bled for switching. As shown in the chart at the right, up to 70% of the Charging Time required for a 100 Car Train is SAVED when all cars are equipped with "QRR" Brake Cylinder Release Valves. Proportionate Savings in Time are effected with only a portion of the train so equipped.

"QRR" is the proven design authorized by the A.A.R. for unlimited application.

Write for circular 99.



THE NEW YORK AIR BRAKE COMPANY

230 PARK AVENUE . NEW YORK 17, N. Y.

New L-M Station Platform Lighting Improves Operations at Havre, Mont.

The full 1500-foot length of the Great Northern's Havre, Mont., station platforms is lighted to an average of 1.98 foot candles by a new Line Material incandescent lighting installation.

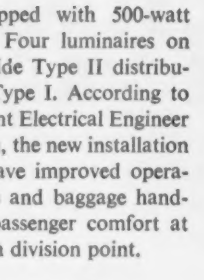
The lighting system consists of 40 L-M Spherolites®, mounted on mastarms or catenary supports. On the station-side platform, six Spherolites are supported by 4-foot brackets on steel poles, four are mounted on brackets attached to the building, and another ten are suspended from a catenary support.

On the platform between east- and westbound trains, the fewest possible support poles were desired. To achieve this, Great Northern engineers designed a catenary support system. Poles are spaced 300 feet apart with four luminaires suspended from a messenger and a 7/16-inch guy strand in each of five spans. End poles were installed offset to counteract the inward pull of the 6000-pound loading of cable and lighting units.

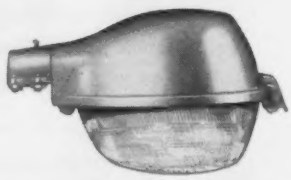
The units are equipped with 500-watt incandescent lamps. Four luminaires on the station side provide Type II distribution; all the others Type I. According to C. G. Nelson, Assistant Electrical Engineer of the Great Northern, the new installation and better lighting have improved operations, speeded service and baggage handling, and increased passenger comfort at this important western division point.

Get Complete Information on L-M Outdoor Lighting

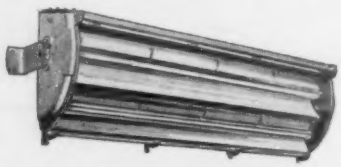
L-M offers a full line of incandescent, mercury vapor, and fluorescent lighting for streets, yards, approaches, areas. Get in touch with the L-M Field Engineer for complete information and bulletins; or write Railway Sales Department, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



L-M's Spherolite Luminaire, the type used in the Great Northern Havre Station Platform installation. The Spherolite is a highly efficient unit, providing wide choice of light distribution, many desirable features. It may be used for either incandescent or mercury vapor lamps.



L-M's Ovalite™, specially designed for mercury vapor, is available in both series and multiple styles, a highly efficient unit with service-safe features.



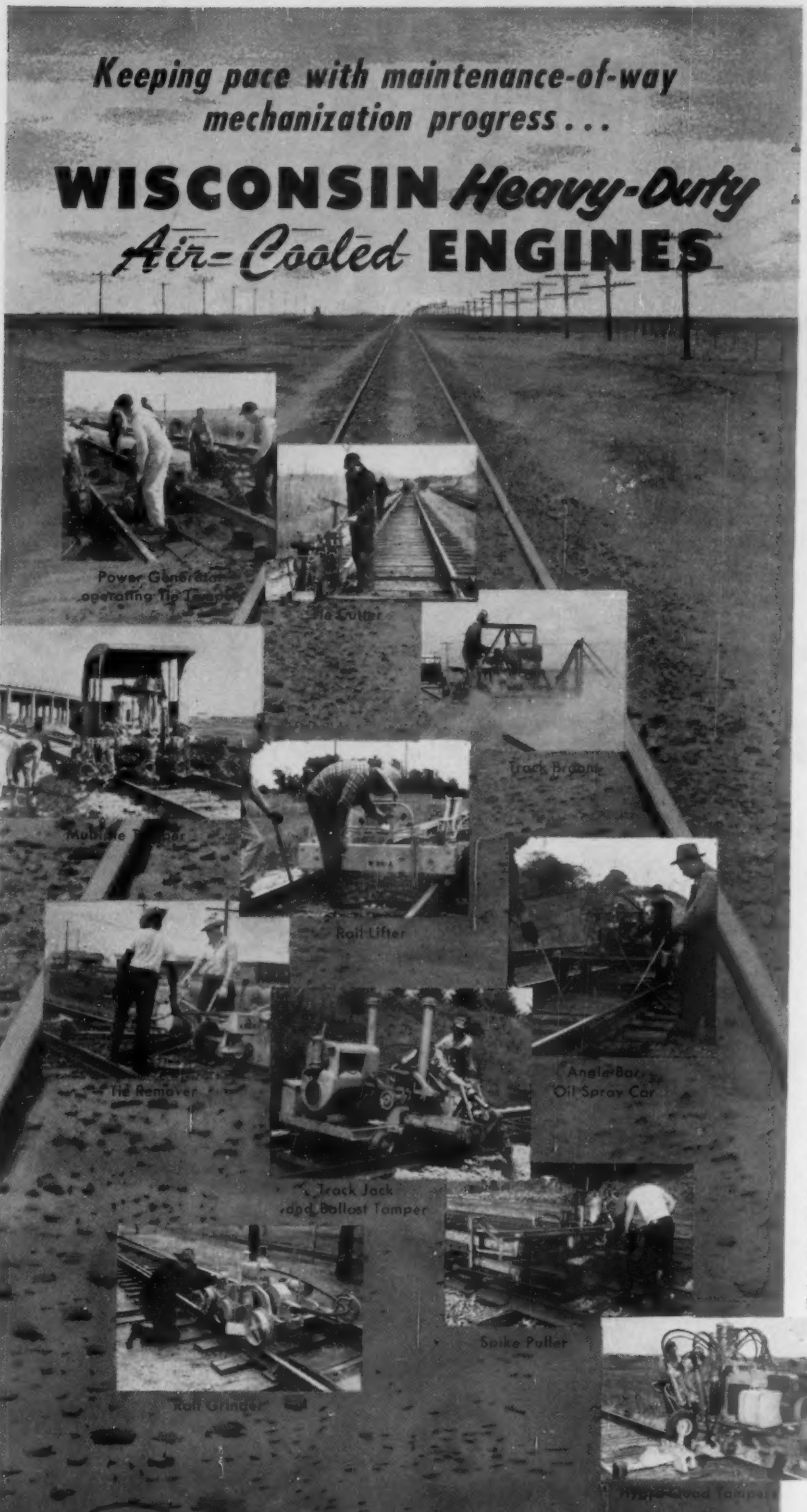
L-M's 2- and 4-lamp fluorescent units are particularly desirable for lighting areas such as classification yards, because of their extremely low glare factor.

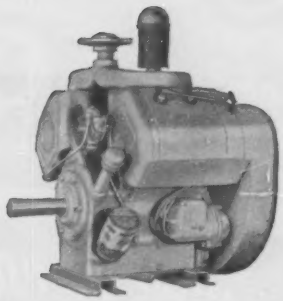
LINE MATERIAL

Street Lighting

Keeping pace with maintenance-of-way mechanization progress . . .

WISCONSIN *Heavy-Duty Air-Cooled* ENGINES





In the struggle to "show a profit" in the face of constantly mounting operating costs, modern Wisconsin-powered maintenance-of-way equipment plays a vitally important and ever-expanding part.

Illustrated here are typical representative pieces of equipment, produced by leading manufacturers in this specialized field of railroad service, designed to increase the productive capacity of M/W workers, speed up operations, improve efficiency, reduce manpower . . . and greatly cut costs.

Wisconsin Heavy-Duty Air-Cooled Engines are especially adapted to this form of service because of their emphatically heavy-duty construction in all details . . . basic High Torque design . . . thoroughly dependable AIR-COOLING at all temperatures from low sub-zero to 140° F. . . . light weight and compactness . . . low cost maintenance . . . quick, easy starting in any weather . . .4-cycle single-cylinder, 2- and 4-cylinder power selectivity in a complete power range from 3 to 36 hp. . . . backed by service through more than 2,200 Authorized Service Stations in the United States and Canada and in 82 foreign countries.

Wisconsin Engines are designed and built to take *abuse* as well as day-to-day *tough use.* Basic High Torque design keeps the equipment going through the shock-loads and Heavy-Duty stamina provides the inbuilt ruggedness that is normally associated with BIG engines. Horsepower for horsepower, there is no more rugged engine than a "WISCONSIN" . . . built to meet your Maintenance-of-Way requirements most efficiently and economically.

• We salute Railway Age on this, its Centennial Anniversary . . . the American Railroads and the Builders of their equipment . . . for a job well done — Empire Builders all, and Pioneers of Progress.

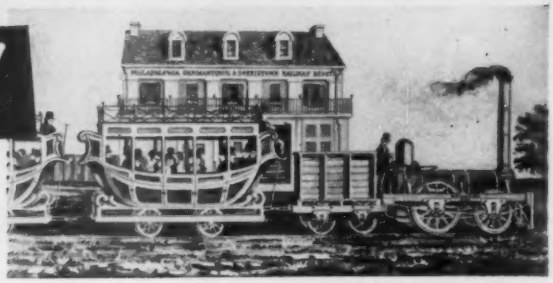
A 6018

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

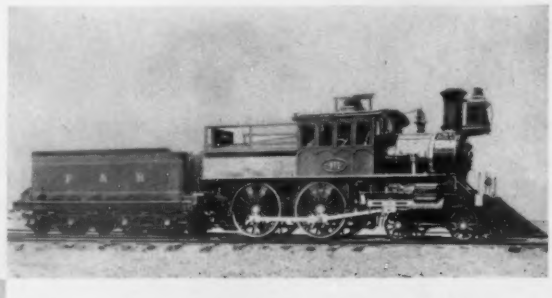
PROGRESS and the READING ...always on the move!



"Old Ironsides", built in 1832, was the first engine to run on the Reading Railroad as well as the first to make scheduled runs in Pennsylvania. It was constructed for the Philadelphia, Germantown and Norristown Railroad.

In more than 120 years of dependable Reading service, one dominant feature stands out. And that is *continuous progress*—unending improvement in every part of the railroad operation. The Reading is truly a railroad for which "firsts" have become a time-honored tradition.

The same kind of research and improvement that has marked Reading progress throughout its history is being carried forward now as never before. Today, as in the past, you have the assurance that your important freight will be carried quickly, safely and economically!



Locomotive 411, built by the Reading Railroad in 1880, was the heaviest class passenger engine constructed in the United States at the time. This pioneer, anthracite-burning, "Camelback"-type locomotive was the high-speed engine of its day. Most important, it exerted marked influence on the development of high-power boilers for the mighty steam locomotives that were to follow.

Today's streamlined locomotives, like this modern diesel-electric, help keep The Reading one of the nation's most progressive railroads.

READING AND RAILWAY AGE PROGRESS TOGETHER TOO!

A steady parade of improvements in railroading made by the Reading has appeared in RAILWAY AGE during the past century. The Reading considers itself fortunate to be covered by such an able railroad magazine. Best wishes for the next century.

Reading Lines

READING RAILWAY SYSTEM

Since . . .

1810

PROGRESS IN THE SCIENCE OF METALLURGY

HUNT-SPILLER GUN IRON CYLINDERS

lowest cost per cylinder mile

Gun Iron Cylinders for Diesel Locomotives

Since 1810 Hunt-Spiller has pioneered in the science of metallurgy with a view towards developing improved metals for railway, industrial and ordnance applications. One of the products of this research, Hunt-Spiller Gun Iron, has contributed greatly to modern Diesel Cylinder performance. Gun Iron is a high strength, dense cast iron which is unusually resistant to wearing action. Melted in an electric furnace under rigid metallurgical control, its structure consists entirely of very dense Pearlite with fine well dispersed Graphite flakes. Its properties, found in no other metal, provide long life, even wearing qualities and a high resistance to water erosion resulting in *lowest cost per cylinder mile.*

Write for **Bulletin H-1 "Gun Iron, Your Key to Lower Cost"**

HUNT-SPILLER GUN IRON · HSGI · SINCE 1810

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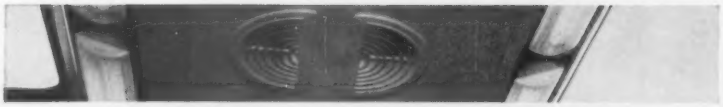


THIS IS THE TRAIN THAT HAS EVERYTHING!

It is the only train between Chicago and the North Pacific Coast that offers you four Vista-Domes . . . the attention of a friendly Stewardess-Nurse . . . the fascinating Traveller's Rest buffet-lounge...plus truly superb meals. This train is the...

VISTA-DOME

NORTH COAST LIMITED

One of the world's *Extra Fine* trains!

The view's terrific on Northern Pacific! Send now for "Northwest Adventure", free booklet of scenic trips. Write G. W. Rodine, 240 Northern Pacific Railway, St. Paul 1, Minn.

Luxury has a western flavor in the colorful "Traveller's Rest" buffet-lounge.

CHICAGO • TWIN CITIES • SPOKANE
PORTLAND • TACOMA • SEATTLE

NORTHERN PACIFIC RAILWAY

Congratulations

to
Railway Age
...for 100 Years
First Choice
for
"Straight"
Rail News
1856

from
MECO
...for 30 Years
First Choice
for
Curve Rail
Safety & Economy
1926

MECO

rail and flange lubricators

Applying protective grease automatically between high rail and wheel flanges, MECO Lubricators reduce friction on curve rails . . . permit hauling of greater tonnage with increased speed and safety. MECO promptly reduces operating and maintenance costs and insures up to four times longer service life on curve rails and locomotive wheel flanges.

Other MECO Products: Meco Rail Layers (Lay Standard, Long or Continuous Welded Rails) • Mack Reversible Switch Point Protectors (Prolong Switch Rail Life) • Velocity Power Rail Punch • TYLIFE (Bonds Spikes or Tie Plugs into Ties.)

Maintenance Equipment Company
RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS

R1394RA

Capacity that Counts When You Need It!

RAILROAD and CAR MATERIAL

STRINGERS, CAPS and SILLS in DENSE SHORTLEAF PINE

SWITCH TIES in OAK and GUM
OAK FREIGHT CARSTOCK and TIMBERS

HERCULIFT PALLETS

INQUIRY INVITED

CROSSETT LUMBER COMPANY

A Division of The Crossett Company
CROSSETT, ARKANSAS

1830 1956

126 YEARS

of *Looking Ahead* on

From—"Bread Line of Confederacy in War Between the States"

To—"The Life Line of Service to ALL AMERICA Today" ▶

ATLANTIC COAST LINE

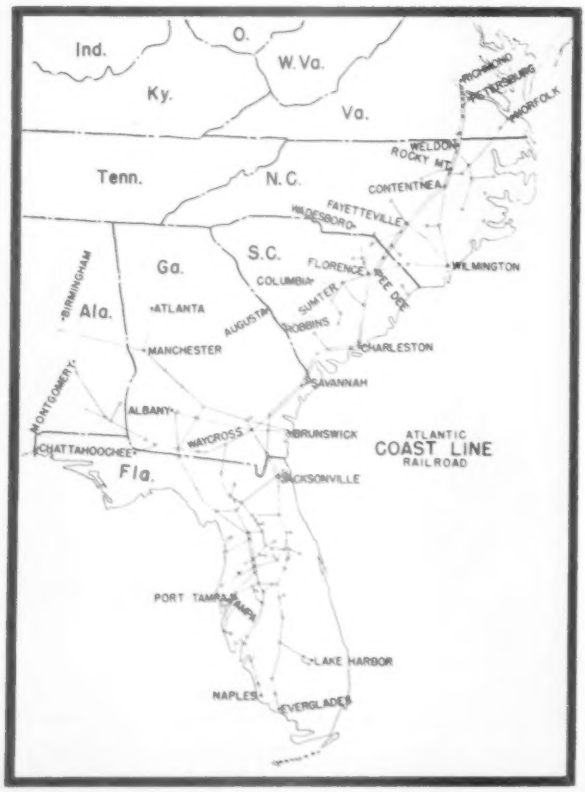
Fragments of its History

What now is the Atlantic Coast Line Railroad represents unification of more than 100 separate small railroads stretching along the coast of the Atlantic Ocean from Norfolk and Richmond, Va., to south Florida, and extending westward to Atlanta, Ga., and to Birmingham and Montgomery, Ala.

The name "Atlantic Coast Line Railroad Company" came into being on May 1, 1900, but its corporate history extends back to February 10, 1830, the date on which the Petersburg Railroad was chartered. Other constituent railroads followed, along with other events of interest, chiefly among which were —

1834: Wilmington & Raleigh Railroad, later changed to Wilmington & Weldon Railroad in 1855.

1836: Richmond & Petersburg Railroad, the corporate progenitor of Coast Line.



What is now the Coast Line represents unification of more than 100 separate small railroads.

1849: The South Carolina group of railroads, commencing with the Wilmington & Manchester, later reorganized into the Wilmington, Columbia & Augusta Railroad in 1870.

1866: Continuous operation of through trains between New York and the South, via Wilmington, was first made possible by means of physical connections constructed between the different railroads.

1870: The Manchester & Augusta Railroad connecting with the Wilmington, Columbia & Augusta at Sumter, extending to Robbins, and later, through trackage rights acquired in 1899 over Charleston & Western Carolina Railway, into Augusta. Also, the Northeastern Railroad of South Carolina from Charleston to Florence.

1885: The Wilmington & Weldon commenced construction of the "Fayetteville cut-off" from Contentnea through Fayetteville to Pee Dee and later opened it for through north-south business on January 1, 1893.

1898: Consolidation began with formation of "Atlantic Coast Line Railroad Company of Virginia" and "Atlantic Coast Line Railroad Company of South Carolina" embracing the Virginia and South Carolina groups, respectively.

1900: Consolidation of railroads north of Charleston accomplished and name changed to Atlantic Coast Line Railroad Company.

1902: Coast Line acquired the Savannah, Florida & Western group of railroads extending from Charleston to Port Tampa with numerous branch lines, popularly known as the Plant System of railways constructed mainly during the decade before the Civil War.

1946: The Atlanta, Birmingham & Coast Railroad was merged into Coast Line, thus extending its lines to Atlanta and Birmingham and forming Coast Line's Western Division.

On the *Coast Line* Today:

A comprehensive program of improvement and modernization of physical properties was undertaken by a far-seeing management after close of the depression cycle about 1939, and has since been progressed — roadway and track structure utilizing heavy rail — new and enlarged yards — automation of signaling and communications — installation of centralized traffic control on heavy traffic density segments — complete dieselization — mechanized operations at key transfer points — modern equipment* — in short, every phase of railroading!

This all adds up to SERVICE

* — Equipment operated by Coast Line includes: 564 diesel-electrical locomotives, over half of which are equipped with automatic train control; 710 passenger and 32,628 freight train cars; and 1,758 units of work equipment. Additional equipment on order at June 30, 1956, includes 1,000 cement-phosphate covered hopper cars, 839 pulpwood rack cars, 746 all-steel box cars, and 2 depressed center flats, a total of 2,587 units of new equipment, all of which will be equipped with roller bearings. After receipt on line, Coast Line will then have 6,695 roller bearing freight train cars. A progressive program of installing radio on freight and passenger trains for end-to-end communication is continuing, with 100 cabooses and 155 locomotives thus far equipped.

"One of America's Great Rail Thoroughfares"

When you say "SERVICE"
You must mean "COAST LINE!"

Consistent improvement in Coast Line service over the years has gone hand-in-hand with the continued modernization and improvement of all facilities enabling Coast Line to materially shorten the running time for its freight trains — such as:

SOUTHBOUND first-class through freight TRAIN 109 out of Richmond 2:30 PM daily, in Jacksonville 5:45 AM following morning — 15 hrs., 15 min. — out of Jacksonville 8:45 AM daily, in Tampa 5:00 PM same day—8 hrs., 15 min., and only 26½ hrs. elapsed time from Richmond! Also, first-class through freight TRAIN 105 out of Richmond 12:30 PM daily, in Jacksonville 5:30 AM following morning. TRAIN 109 connects at Florence with expedited schedules to Augusta, and there with Georgia Railroad to Atlanta for connection with L&N and NC&St.L.

NORTHBOUND companion first-class through freight TRAIN 110 from Tampa to Richmond, providing third morning arrival at Philadelphia, New York, and the surrounding area. Also, TRAIN 112 offering the fastest perishable freight train service ever operated out of Florida and providing third morning deliveries in the New York area, as well as at Chicago, Detroit, and other points in western territory, along with dependable fourth morning service to Boston and other New England points.

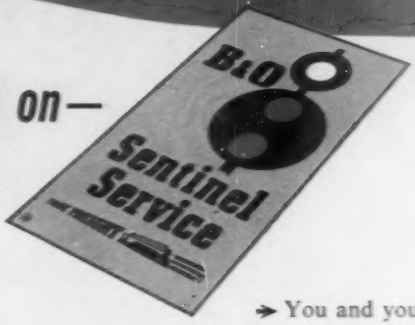
Other fast schedules connecting with TRAINS 109 and 110 greatly expedite traffic from and to the Montgomery, Birmingham, Atlanta, and Albany gateways and from and to such points as Spartanburg and Greenville in connection with CN&L and C&WC.

ATLANTIC
COAST LINE
RAILROAD

WILMINGTON, NORTH CAROLINA

SHIPPING PROBLEMS EVER PUT YOU OVER A BARREL?

Depend on—

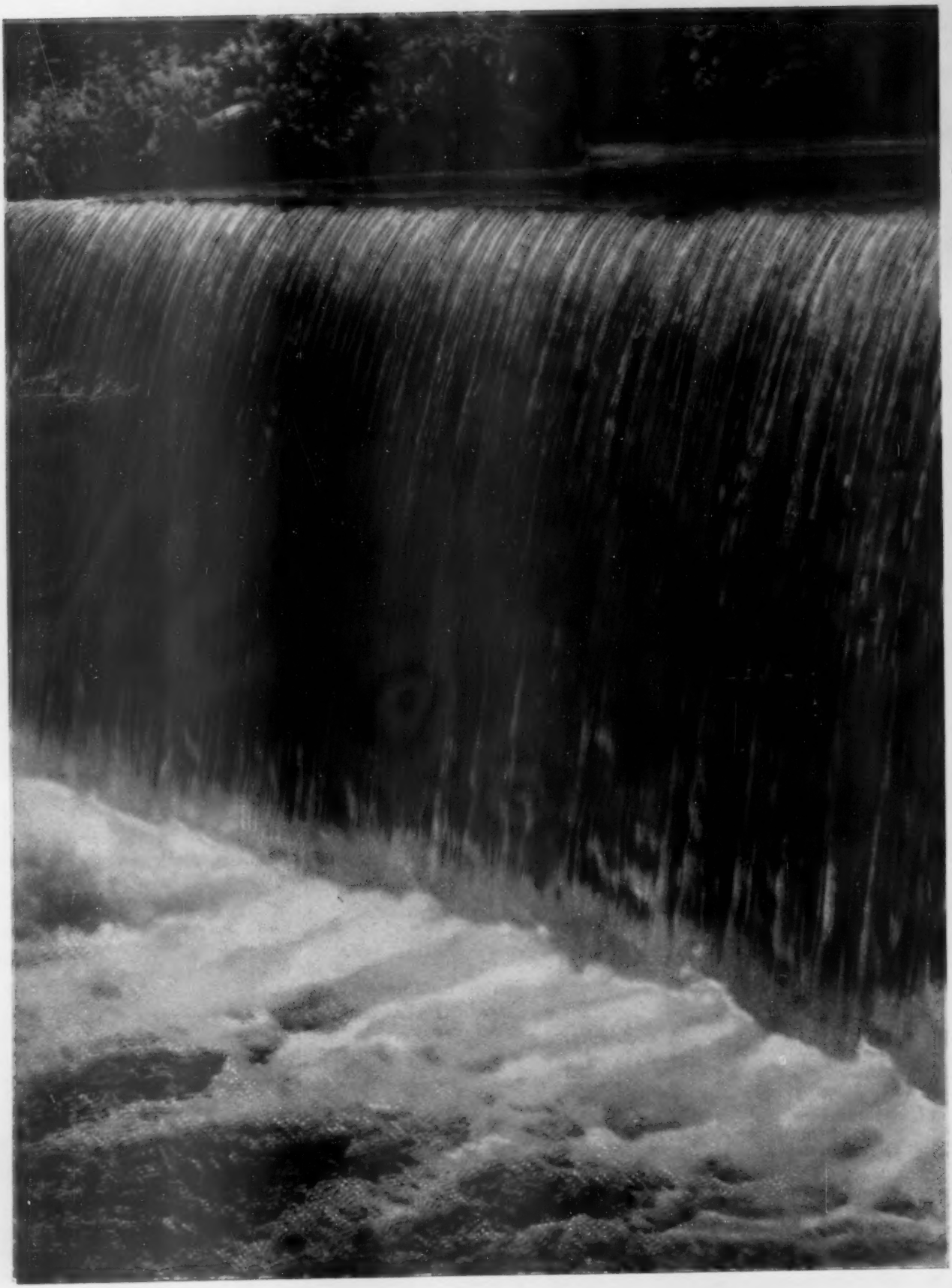


➔ You and your customer need not worry over vital carloads of freight when you route them B&O Sentinel Service! Sentinel cars move on fast, accurate schedules from siding-to-siding and you, as consignor or consignee, *are notified* immediately of any schedule interruptions and reforwardings. Your 'when and where' questions on carload movement are answered *automatically* when you ship by Sentinel Service—no other service matches its proved dependability.

Ask our man!

BALTIMORE & OHIO RAILROAD

Constantly *doing things*—**better!**



IT would take a big book indeed to record the progress and growth of the Southern Railway System over the past 100 years. After all, we were a quarter century old when today's RAILWAY AGE was born! But that's "water over the dam."

Right now—proud as we are of our history—the men and women of the Southern are too busy moving ahead *today* and planning ahead for *tomorrow* to give more than a passing thought to our yesteryears. And with modern equipment and facilities plus up-to-the-minute methods we're ready and eager to meet the challenge of ever-increasing transportation needs for the fast-growing South we serve.

Looking ahead, only one "road block" looms on the horizon. It is the unequal competitive situation in the intercity transportation field that grows more and more critical with each passing year. It can be corrected by fair-minded legislation that recognizes no favorites and grants no favors. In the interest of *all* carriers—and of our country as well—we look forward to the day when this unhealthy condition, too, will be "water over the dam."

Harry A. DeButts
President

SOUTHERN RAILWAY SYSTEM

WASHINGTON, D. C.

THE SOUTHERN SR SERVES THE SOUTH

YESTERDAY...TODAY...TOMORROW...

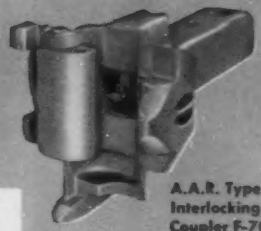
dependable performance and long service life with

Symington®

RAILWAY EQUIPMENT PRODUCTS

A.A.R. Standard
E Coupler
Rigid Shank E-60

Chrysler Design Truck



A.A.R. Type F
Interlocking
Coupler F-70

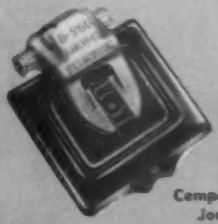
Striking Casting and
Center Filler—3-piece
Design Welded and
Stress-Relieved

Congratulations to Railway Age!

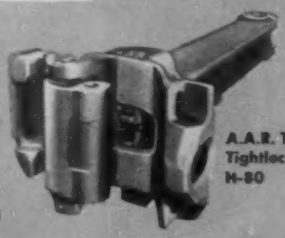
. . . on a century of fine reporting and championing the causes of the railway industry. Over 50 years ago, the Gould Coupler Co. was a regular advertiser as shown by the ad above taken from the January 5, 1906, issue of Railway Age.

Long Travel
Snubber for
Locomotive and
Passenger Cars

Truck Spring
Snubber



Composite Articulated
Journal Box Lid

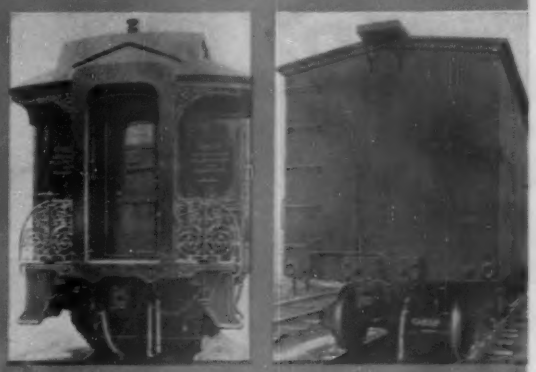


A.A.R. Type H
Tightlock Coupler
H-80

THE SYMINGTON-GOULD CORPORATION

YESTERDAY...

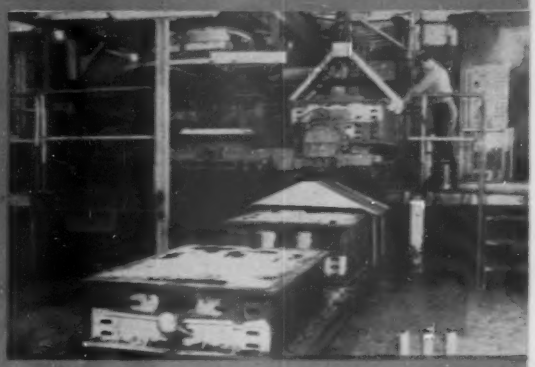
For more than 73 years products of Symington-Gould have been a major factor in helping the railway industry build an outstanding record of performance. Starting as the Gould Coupler Company, at Depew, N. Y., the original firm supplied freight and passenger car couplers and passenger car vestibules and platforms. All leading railroads of the late 1800's were customers of Gould Coupler Co.



At left, passenger car pendulum vestibule and coupler installed. At right, freight coupler application. Both illustrations from the Gould Coupler catalog of 1893.

TODAY...

Recognized by the railway industry as a quality manufacturer, Symington-Gould designs and manufactures steel castings for railway equipment, couplers, truck parts, draft gear attachments, journal box lids and car truck snubbers. Experienced personnel in the design, engineering and production of heavy steel casting is the key to Symington-Gould's record of quality and reliability for its products.



Automatic high speed molding machine of the latest design produces uniform castings of many types.

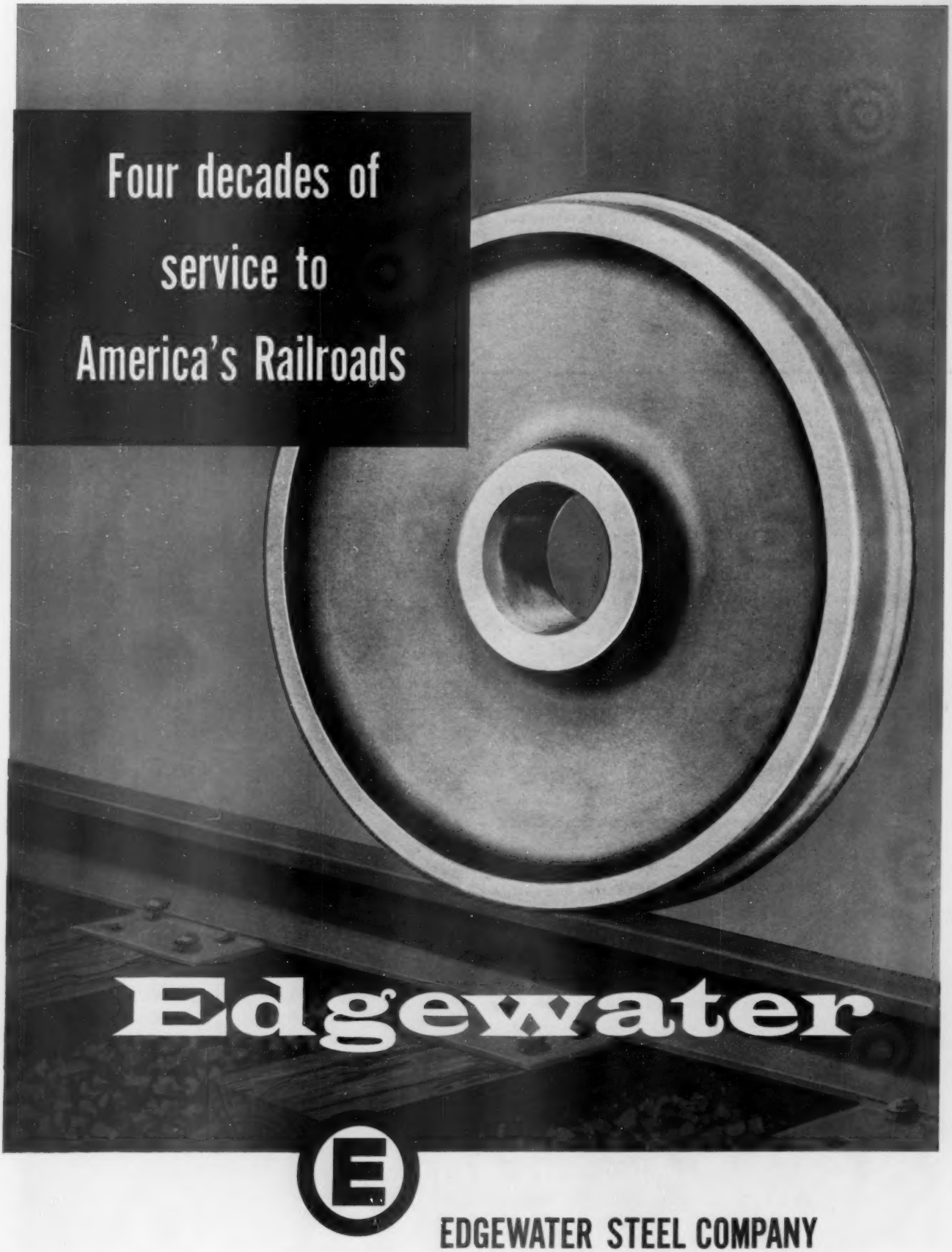
TOMORROW...

Symington-Gould looks ahead to many years of serving the railway industry. Research and engineering, with veteran personnel at the helm, are constantly adding new engineering talent to insure a long range program of continued improvement in design and quality of Symington-Gould railway equipment products. Complete testing facilities for in-plant and road test programs are maintained by Symington-Gould. It is the desire of the corporation to help make even better the operating record of the railway industry and contribute important equipment advances in the years ahead.

Side Frame Fatigue Testing Machine specially designed for dynamic testing of railway freight truck side frames. This is one of two in the United States specified by the Association of American Railroads to establish acceptability of new designs of side frames.

WORKS: DEPEW, NEW YORK

New York • Chicago • St. Louis • Boston • San Francisco
In Canada: ADANAC SUPPLIES, LTD., Montreal, Quebec



EDGEWATER STEEL COMPANY

Edgewater's HUNGERFORD cartoons depict familiar Railroad problems

trying to make ends meet

who called the railroads a "monopoly"?

let competition decide

"horse and buggy" leadership in an atomic age

Will these same problems prevail during "The Decade Ahead"?

rolled steel wheels FOR

FREIGHT CARS
PASSENGER CARS
DIESEL LOCOMOTIVES

P. O. BOX 478, PITTSBURGH 30, PA.

FABREEKA

Pads and Units

REDUCE IMPACT SHOCK, VIBRATION, NOISE and MAINTENANCE

In Equipment, Bridge and Track Structures

For over 20 years Fabreeka has been successfully used to absorb the destructive force of heavy impact shock, prevent the transmission of high frequency vibration, and reduce noise by intercepting metal to metal contact.

Scientifically designed and engineered, Fabreeka is unaffected by weather conditions, resists steam, heat, cold, brine, and abrasive action, and has a static load breakdown up to 14,000 lbs. per square inch. The physical properties of Fabreeka are found in no other material on the market.

LOCOMOTIVES

PASSENGER CARS

ON BRIDGES AND UNDER BRIDGE PEDESTALS

IN PASSENGER CARS

In addition to standard pads of varying thickness, Fabreeka is processed into many different shapes and molded forms for use in more than 70 principal applications in the trucks and platforms of Passenger Cars. Fabreeka contributes to increased passenger comfort through reducing transmitted vibration and noise, and also helps keep maintenance costs down.

IN LOCOMOTIVES

Fabreeka Pads and units are designed to absorb impact shock and vibration; protect vital parts against mechanical wear, fatigue and breakage . . . and are installed at many important points on Diesel Electric Locomotives.

IN BRIDGES

Used as Pedestal Pads, Bridge Shoe Pads and Ballastless Bridge Deck Pads, Fabreeka absorbs impact shock and vibration; distributes loads evenly; eliminates abrasive action between masonry plates and bridge seats; prevents flaking and cracking of concrete; reduces tendency for cracks to develop in steel decking; prolongs bridge life; reduces noise; and cuts maintenance cost.

On steel and concrete decked bridges . . . Fabreeka pads eliminate the need of tie and ballast, reduce foundation depth, and proper clearance is obtained for the underpass with appreciable saving in excavation and concrete work.

UNDER VIADUCT PEDESTALS

UNDER RAIL CHAIR ON STEEL DECK

IN TRACK

At points of severe service — under crossings, in scales, turntables and retarders, Fabreeka Pads are designed to absorb impact shocks and vibration, to reduce maintenance, and to prolong life. Under crossings Fabreeka increases the life of the Manganese points and rail ends through cushioning of impact blows from the wheels.

UNDER RUNNING RAIL

UNDER TRACK CROSSINGS

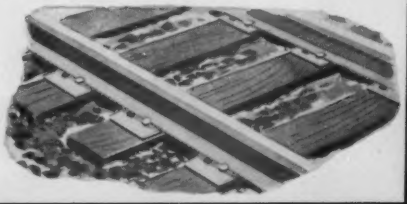
UNDER RETARDERS

UNDER TRACK SCALES

It Pays to Specify Fabreeka!

FABCO TIE PADS

Reduce Mechanical Wear of Ties



Of a different construction from Fabreeka, Fabco Tie Pads are priced to justify their economical use — and are recommended for installation on curves, bridges, insulated rail joints, switches, station tracks and station approach tracks.

FABCO Tie Pads are made in two thicknesses and in two types — Self-Sealing and Uncoated.

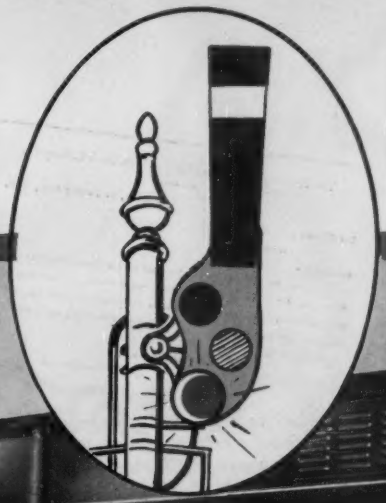
FABREEKA PRODUCTS COMPANY, INC.

1190 Adams Street, Boston 24, Mass.

NEW YORK · CHICAGO · DETROIT · TOWSON, MD. · CLEVELAND · PHILADELPHIA
PITTSBURGH · OAKLAND · LONG BEACH · SPARTANBURG · MILWAUKEE
Canadian Representative: INTERNATIONAL EQUIPMENT COMPANY, MONTREAL

YOU'RE STARTING OFF WITH THE RIGHT BATTERY WHEN IT'S A . . . . .

K-W



K. W. LOCOR BATTERIES
For all makes of Diesels

K-W's low corrosion plates extend the life of the battery and reduce operating costs.

The country's leading railroads rely upon dependable K-W Batteries for better performance and economical operation, whether it be road, general purpose or yard service.

K-W Batteries also supply ample reserve power for control circuits, lighting and auxiliary equipment . . . positive dependable power for any diesel requirements.

Also K-W Batteries for car lighting and air conditioning.

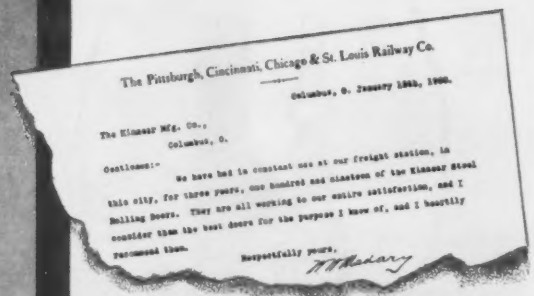
Write for details and specifications.

K-W LOCOR
DIESEL STARTING BATTERIES
with LOCOR—the Time Tested Silver Alloy

KW BATTERY COMPANY, INC.
SKOKIE, ILLINOIS • BROOKLYN, NEW YORK

K-W FOR QUICKER STARTS CONTINUOUS SERVICE LONGER LIFE

KINNEAR Rolling Doors


The Pittsburgh, Cincinnati, Chicago & St. Louis Railway Co.

Columbus, O. January 18th, 1900.

The Kinnear Mfg. Co.,
Columbus, O.

Gentlemen:-

We have had in constant use at our freight station, in this city, for three years, one hundred and nineteen of the Kinnear Steel Rolling Doors. They are all working to our entire satisfaction, and I consider them the best doors for the purpose I know of, and I heartily recommend them.

Respectfully yours,

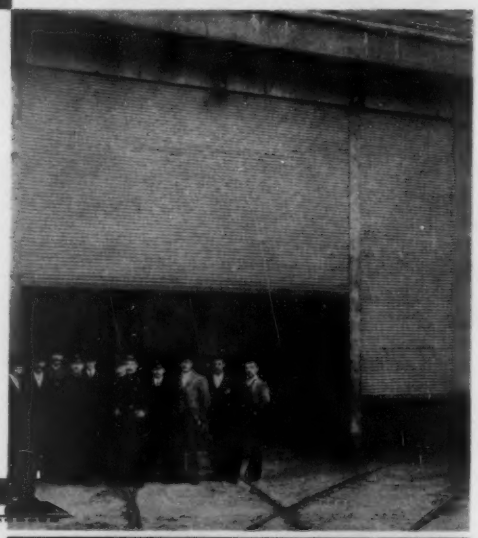
Even before the turn of the century, Kinnear's files already held scores of letters from enthusiastic users of Kinnear Rolling Doors, in every branch of railroading. And user-approval has continued ever since.

60 Years of Progress with the Railroad Industry

THE RAILROAD GAZETTE. April 27, 1906.

KINNEAR
STEEL ROLLING DOORS
THE KINNEAR MFG. CO., Columbus, Ohio
BOSTON PHILADELPHIA CHICAGO

Another half century has been added to the years of service Kinnear Rolling Doors had already marked in the Railroad Industry when this Kinnear Door advertisement appeared in 1906.



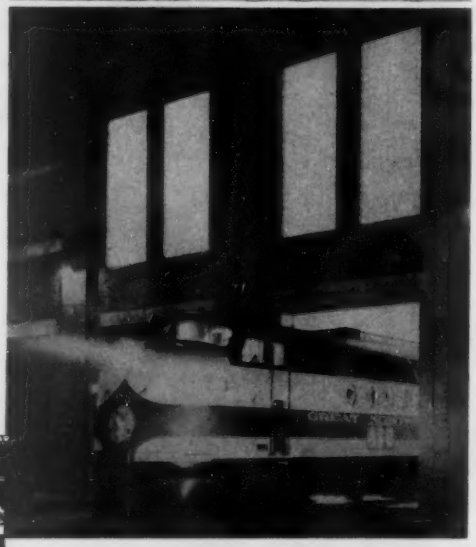
The space-saving efficiency and rugged protection of the interlocking-slat door (originated by Kinnear) won quick, lasting acceptance in all industrial and commercial fields. *And many of the Kinnear doors installed 40 and 50 years ago — and before — are still in regular service today!*

But the company that designs and builds these famous doors has always been a major factor in their wide preference, too. For example, Kinnear has specialized in building *upward-acting doors exclusively*. To do this one job at its best, they have always maintained a nationwide network of able, reliable representatives, offering complete engineering cooperation on every door need or problem.

Also, Kinnear's trained construction crews have been available, to take full responsibility for Kinnear installations whenever desired.

To complete this service, records of every door sold are permanently held in fire-proof vaults, so that accurate replacement parts are always available.

Today, because of this combination of satisfactory service and cost-cutting door performance, the name "Kinnear" stands for leadership in doors the world over.



Saving Ways in Doorways

KINNEAR
ROLLING DOORS

The KINNEAR Manufacturing Co.
FACTORIES: 2020-40 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

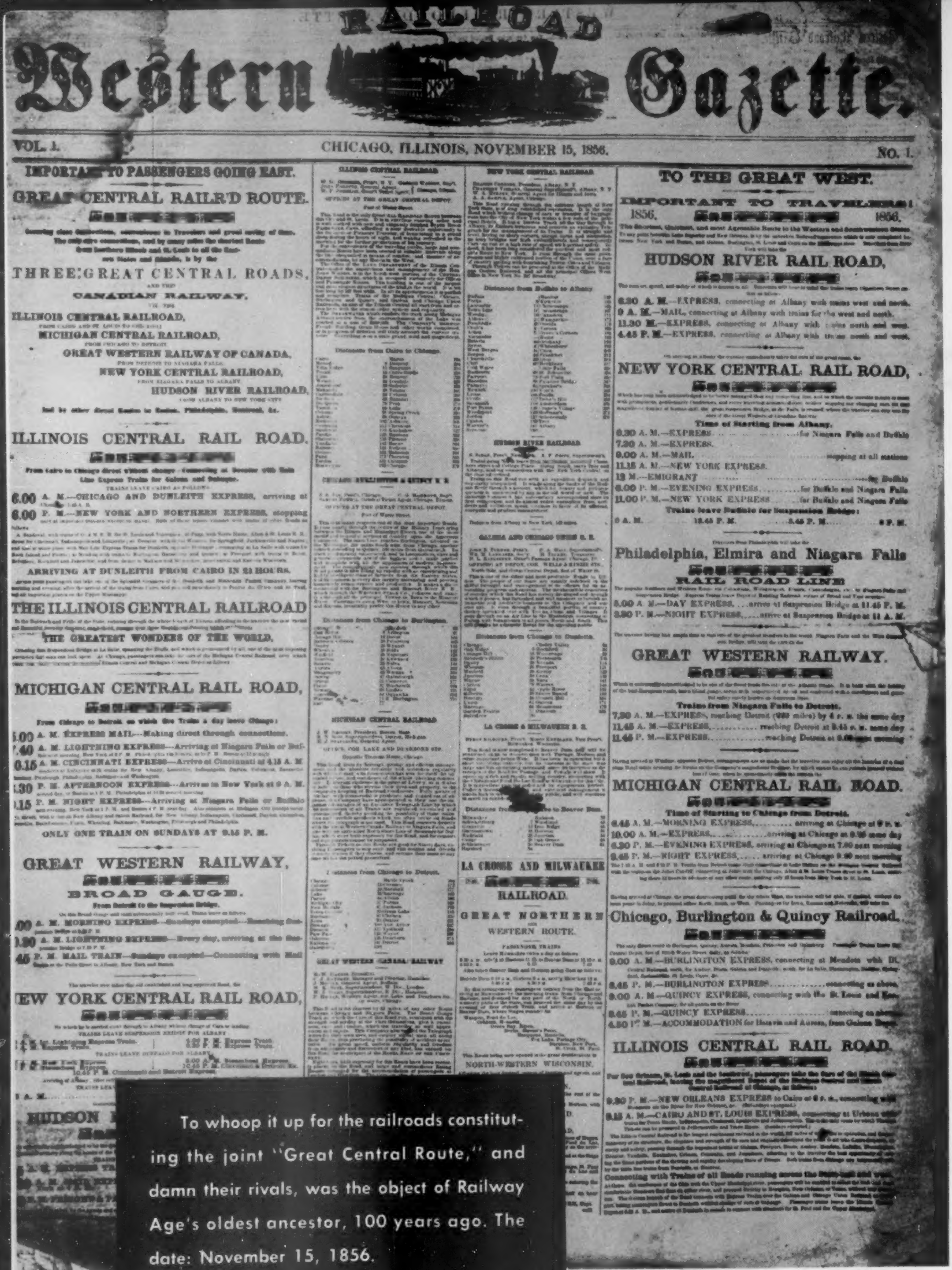
...Report to the Readers

100 YEARS OF RAILWAY AGE

THE PAPER...

THE JOB...

THE FIELD...



RAILROAD
Western Gazette.

VOL. 1. CHICAGO, ILLINOIS, NOVEMBER 15, 1856. NO. 1.

IMPORTANT TO PASSENGERS GOING EAST.

GREAT CENTRAL RAILR'D ROUTE.

THREE GREAT CENTRAL ROADS,

CANADIAN RAILWAY,

ILLINOIS CENTRAL RAILROAD,

MICHIGAN CENTRAL RAILROAD,

GREAT WESTERN RAILWAY OF CANADA,

NEW YORK CENTRAL RAILROAD,

HUDSON RIVER RAILROAD,

ILLINOIS CENTRAL RAIL ROAD.

6.00 A. M.—CHICAGO AND DUNLEITH EXPRESS, arriving at

6.00 P. M.—NEW YORK AND NORTHERN EXPRESS, stopping

ARRIVING AT DUNLEITH FROM CAIRO IN 21 HOURS.

THE ILLINOIS CENTRAL RAILROAD

THE GREATEST WONDERS OF THE WORLD,

MICHIGAN CENTRAL RAIL ROAD,

A. M. EXPRESS MAIL—Making direct through connections.

A. M. LIGHTNING EXPRESS—Arriving at Niagara Falls or Buffalo

A. M. CINCINNATI EXPRESS—Arrive at Cincinnati at 4.15 A. M.

P. M. AFTERNOON EXPRESS—Arrives in New York at 9 A. M.

P. M. NIGHT EXPRESS—Arriving at Niagara Falls or Buffalo

ONLY ONE TRAIN ON SUNDAYS AT 9.15 P. M.

GREAT WESTERN RAILWAY,

BROAD GAUGE.

From Detroit to the Suspension Bridge.

A. M. MORNING EXPRESS—Sundays excepted—Reaching Suspension Bridge

A. M. LIGHTNING EXPRESS—Every day, arriving at the Suspension Bridge

P. M. MAIL TRAIN—Sundays excepted—Connecting with Mail

NEW YORK CENTRAL RAIL ROAD,

HUDSON

ILLINOIS CENTRAL RAILROAD

Distances from Cairo to Chicago.

CHICAGO BURLINGTON & QUINCY R. R.

Distances from Chicago to Burlington.

MICHIGAN CENTRAL RAILROAD

Distances from Chicago to Detroit.

GREAT WESTERN CANADA RAILWAY

NEW YORK CENTRAL RAILROAD

Distances from Buffalo to Albany

HUDSON RIVER RAILROAD

GALENA AND CHICAGO UNION R. R.

Distances from Chicago to Dunleith.

LA CROSSE & MILWAUKEE R. R.

LA CROSSE AND MILWAUKEE RAILROAD

GREAT NORTHERN AND WESTERN ROUTE.

NORTH-WESTERN WISCONSIN.

TO THE GREAT WEST.

IMPORTANT TO TRAVELERS!

1856. 1856.

HUDSON RIVER RAIL ROAD,

6.30 A. M.—EXPRESS, connecting at Albany with trains west and north.

9 A. M.—MAIL, connecting at Albany with trains for the west and north.

11.30 M.—EXPRESS, connecting at Albany with trains north and west.

4.45 P. M.—EXPRESS, connecting at Albany with trains north and west.

NEW YORK CENTRAL RAIL ROAD,

Time of Starting from Albany.

6.30 A. M.—EXPRESS .... for Niagara Falls and Buffalo

7.30 A. M.—EXPRESS.

9.00 A. M.—MAIL .... stopping at all stations

11.15 A. M.—NEW YORK EXPRESS.

12 M.—EMIGRANT .... by Buffalo

6.00 P. M.—EVENING EXPRESS .... for Buffalo and Niagara Falls

11.00 P. M.—NEW YORK EXPRESS .... for Buffalo and Niagara Falls

Trains leave Buffalo for Suspension Bridge:

6 A. M. ... 12.45 P. M. ... 3.45 P. M. ... 8 P. M.

Philadelphia, Elmira and Niagara Falls

RAIL ROAD LINE

5.00 A. M.—DAY EXPRESS, ...arrive at Suspension Bridge at 11.45 P. M.

3.30 P. M.—NIGHT EXPRESS, ...arrive at Suspension Bridge at 11 A. M.

GREAT WESTERN RAILWAY.

Trains from Niagara Falls to Detroit.

7.30 A. M.—EXPRESS, reaching Detroit (229 miles) by 4 P. M. the same day

11.45 A. M.—EXPRESS, ... reaching Detroit at 9.45 P. M. same day

11.45 P. M.—EXPRESS .... reaching Detroit at 8.00 next morning

MICHIGAN CENTRAL RAIL ROAD.

Time of Starting to Chicago from Detroit.

6.45 A. M.—MORNING EXPRESS, ... arriving at Chicago at 9 P. M.

10.00 A. M.—EXPRESS .... arriving at Chicago at 9.30 same day

6.30 P. M.—EVENING EXPRESS, arriving at Chicago at 7.00 next morning

9.45 P. M.—NIGHT EXPRESS, ... arriving at Chicago 9.00 next morning

Chicago, Burlington & Quincy Railroad.

9.00 A. M.—BURLINGTON EXPRESS, connecting at Mendota with Ill. Central Railroad

8.45 P. M.—BURLINGTON EXPRESS .... connecting as above.

9.00 A. M.—QUINCY EXPRESS, connecting with the St. Louis and Keokuk Packet Company, for all points on the River

8.45 P. M.—QUINCY EXPRESS .... connecting as above.

4.50 P. M.—ACCOMMODATION for Batavia and Aurora, from Galena Depot.

ILLINOIS CENTRAL RAIL ROAD.

9.30 P. M.—NEW ORLEANS EXPRESS to Cairo at 6 P. M., connecting with

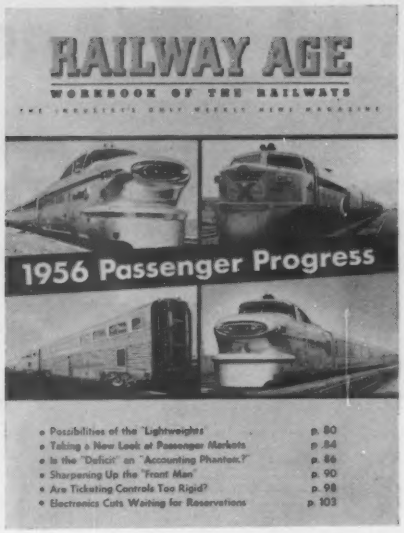
9.15 A. M.—CAIRO AND ST. LOUIS EXPRESS, connecting at Urbana with

Connecting with Trains of all Roads running across the State east and west.

To whoop it up for the railroads constituting the joint "Great Central Route," and damn their rivals, was the object of Railway Age's oldest ancestor, 100 years ago. The date: November 15, 1856.

1956

1856


RAILWAY AGE
WORKBOOK OF THE RAILWAYS
1956 Passenger Progress
• Possibilities of the "Lightweights" p. 80
• Taking a New Look at Passenger Markets p. 84
• Is the "Deficit" an "Accounting Phantom?" p. 86
• Sharpening Up the "Front Man" p. 90
• Are Ticketing Controls Too Rigid? p. 98
• Electronics Cuts Waiting for Reservations p. 103

Publications Have Changed . . .

The melange of railroad advertisements reproduced on the page to the left was placed in the mails just about two months short of 100 years ago. It constituted the first page of the first issue of the oldest ancestor of Railway Age.

The Western Railroad Gazette, as it was called, wasn't much of a paper, to put it bluntly. It was not a businesspaper at all, in fact. It didn't do a businesspaper's job.

It was not addressed primarily to the men who run railroads. There was not a line in its four littered pages which would help them build or run railroads better.

Its audience was the public at large—chiefly the traveling public, and probably largely commercial travelers—most of whom got the paper free.

Its chief advertisers were railroad companies. Other products and services hawked in its columns included hotels, clothing, patent medicines, tobacco, jewelry, banks, business schools and stock brokerage.

The reader pages contained little of serious import to railroad men. They comprised mostly endless praises of the routes and services of the railroads which advertised, and horrendous tales of accidents, lateness, rudeness and discomfort in the cars of their non-advertiser rivals.

. . . Through a Hundred Years . . .

Then—in 1870—the paper got a new owner and a new name. Now the Railroad Gazette, it was edited for the railroad officer. In "A Talk with Our Readers" in the first issue, the publisher announced the intention of making the paper "a complete repository of railroad news," including "descriptions of engineering works and improvements in machinery and rolling stock."

The reoriented Gazette met with high success. It served a real need. Never too enthusiastic about what it referred to as "those trade journals," the daily newspaper fraternity nevertheless recognized in the editorial brains of the Gazette a good journeyman newsman. Said the New York World, upon receipt of the first copy of the Gazette in 1870:

> "The news is very full, the discussions are conducted in good temper and with excellent information. . . . The conductors of the Gazette know what 'tailoring' is, and what a proper weekly journal should be."

. . . Along With the Railroads

As the emphasis in railroading changed, so did the proportion of material in its business press. Throughout these shifts, Railway Age and its absorbed ancestors carried on the weekly job of winnowing through the vast outpouring of news about railroads and for railroaders and presenting accurately, and speedily, the significant parts.

The pages which follow tell the story of Railway Age through 100 years. As was the accomplishment of its "proprietors" in 1870, the goal of Railway Age for its next 100 years is to give "full news," with shrewd "tailoring," to the end of producing "a proper weekly journal."

Railway Age's First Hundred Years

Serving an active and trouble-prone industry, keeping ahead of it editorially, has been achievement of a succession of crusading editors

"It may be true that experince is the best teacher. But a man is a damned fool who cannot learn by anybody's experience but his own."

This, inelegant though it be, was the observation used constantly by W. H. Boardman, long-time editor of a predecessor paper of Railway Age, to remind railroaders that nobody lives long enough to be able to learn everything though his own mistakes and that a man in business needs the eyes and ears of a journal devoted to his peculiar needs—to give him in palatable form, with reasonable speed, at timely intervals, the experience of his colleagues.

It pretty well states, too, the reason why, come November 15, Railway Age will have behind it a record of 100 years of continuous publication as a weekly industrial business journal.

Today's Railway Age is the direct descendant of two lines of blood ancestors—the Railway Age and the Railroad Gazette. To these there was added, late in the span of the paper's history, a third, less characteristic family, the Railway Review.

All three lines began their experience in Chicago.

The Gazette

Oldest of the family lines was the Gazette, which was born—as the Western Railroad Gazette—in the "printing rooms" of the Chicago Tribune on November 15, 1856. It had yet no office of its own and "our friends and those desiring to patronize us" were directed to leave their orders with Mr. William M. Medill at the Tribune's office, 53 Clark street.

The paper, as initiated, was not a true businesspaper. Its goal was to tout the routes and services of railways which advertised in its pages and to criticize the routes of the roads which did not. It circulated among the public at large. It did not undertake true reporting; it was produced with pastepot, shears and considerable gall.

The Western Railroad Gazette's purpose was clear—"to detail for the public benefit and convenience statistics and reliable information, and we shall, from time to time, write concerning the Great Consolidated Route [i.e., "Great Central"] beween New York and all important points west of us, comprising that list of railroads that have honored us with their liberal patronage. . . .

"In presenting their claims upon the public confidence and patronage we shall confine ourselves to that justice and credit which they so amply deserve, and show, from what is being done, or is now doing, whether their success, popularity and increased prosperity is the legitimate result of prudent, skillful and superior management."

There was little change in the character of the paper during the 14 years before it became the Railroad Gazette. Some railroads ceased to advertise their passenger schedules and services but others took their places. At no time were there more than two or three advertisements of suppliers soliciting the patronage of the railroads. Advertisements intended for the attention of the general public continued in volume throughout the period.

In 1870 the Gazette was purchased

(Continued on page 88)

SOME RAILWAY AGE "FIRSTS"

- First periodical to operate a permanent exhibition center for advertisers—in Chicago's Grand Pacific Hotel, in the eighties.
- First weekly businesspaper in U.S. to publish daily editions during industry convention.
- First industry paper edited to interest and instruct employees as well as management.
- First technical publication serving a single industry to use photo engravings.
- First technical publication to use color on editorial pages (1881).
- First businesspaper to use color on advertising pages (Westinghouse Air Brake Company, 1896).
- First periodical to define and use term "public relations" (1909); Railway Age's *Yearbook of Railway Literature*, published in 1897, stated its object as putting into permanent form "all papers or addresses on the *public relations* of the railways."
- First single-industry weekly paper to open an editorial office at the national capital and put a fulltime member of its industry-trained editorial staff in charge of it (1916).

May 7, 1868

1856

Western Railroad Gazette.

November 15, 1856

April 2, 1870

June 17, 1876

THE RAILWAY REVIEW

June 1879

THE Northwestern Railroader

April 8, 1887

The Railway Age

AND

Northwestern Railroader.

September 19, 1891

The Railway Age

May 3, 1901

Railroad Age Gazette

June 5, 1908

Railway Age Gazette

January 7, 1910

Railway Age

January 4, 1918

Railway Age

January 1, 1927

1956

Railway Age's family tree: Its two main blood lines—the Gazette and the Age—combined in 1908. The Railway Review, a third ancestral line of somewhat different character, was absorbed effective 1927.

by W. N. Kellogg. He renamed it Railroad Gazette; changed its character completely, and at once directed it on a new course—on a long career of influence in the shaping of transportation history.

Change of Purpose

As was apparent with the first issue of the new paper on April 3, it was to be edited for the railroad officer. The paper was not only to be "a complete repository of railroad news," but something more. Promised its new owner: "We shall not be satisfied unless and until the Railroad Gazette is made an effective instrument for elucidating the science and perfecting the art of transportation; not by suggestions or instructions of its conductors, so much as by the teachings and discussions by practical railroad men given in its columns."

In the first issue there were 16 advertisers soliciting the patronage of the railroads for a variety of materials and equipment intended specifically for railroad use. Railroads continued, however, to advertise their passenger schedules; and several "fast freight" lines, by which a number of railroads were welded into a single route, began to advertise their services between points in the West and the Atlantic seaboard.

In 1871, the printshop, files and a great part of the October 7 issue of the Railroad Gazette were destroyed in the great Chicago fire. Kellogg had other business interests, all of which were deeply involved by losses suffered in the fire. Silas W. Dunning and Matthias N. Forney jointly took the Gazette off his hands and moved it to New York. Both contributed much to the character of the paper.

Dunning was joint owner and editor from 1871 to 1887. It was his ambition to develop a journal which should have a positive influence on railroad practice and railroad legislation.

Forney, who shared ownership of the paper with Dunning and was its associate editor dealing with engineering and mechanical matters until 1883, was a mechanical engineer. It was he who was responsible for the Gazette's key position in the campaign for the establishment of standard bolt threads in the United States.

Forney was long interested in the Master Car Builders' Association (now part of the AAR Mechanical Division). He is credited with proposing representative membership, voting according to car ownership, for that association, which had the important task, never since neglected, of establishing standards for freight cars, permitting their universal interchange. He was also a member of a committee of that body to prepare a "dictionary of terms used in car building" and did the writing of the text. The book was published by the Railroad Gazette. It was the forerunner of today's Car Builders' Cyclopedia, which is one of the Railway Age family.

Henry G. Prout became editor of the Railroad Gazette in 1887, succeeding Dunning. He was a distinguished civil engineer, a scholar and a prolific lecturer and writer.

William Henry Boardman became editor of the Railroad Gazette on the retirement of Colonel Prout and continued as editor of the Railroad Age Gazette for three years after the merger of the Railway Age and the Railroad Gazette in 1908. His contribution to the paper, however, was more as its business manager and publisher than as its editor. He became a part owner by the purchase of Forney's and at least a part of

(Continued on page 92)

Assorted advertisements occupied old-time front covers . . . ▶

. . . But failed, like those inside, to "work" the product ▼

RAMAPO WHEEL AND FOUNDRY COMPANY.
MANUFACTURERS OF
WHEELS for DRAWING-ROOM & SLEEPING COACHES, LOCOMOTIVES,
Tenders, Passenger and Freight Cars. Axles Furnished and Wheels Fitted.
W. W. SNOW, Superintendent.
Ramapo, Rockland County, N. Y.

IN THE MID-SEVENTIES, the art of advertising consisted in putting one's "card" in the book. It told what you made, and where your officers could be found. Nothing more. Still advertising in Railway Age are "descendants" of these two advertisers—American Brake Shoe, succeeding Ramapo, and Alco Products, which absorbed Schenectady. To see how advertising has changed, look at their copy today—it tells about the products, and how to use them.

RAILWAY AGE–JUST A YOUNGSTER!

TO THE EDITOR:

Railway Age is to be congratulated on having reached its 100th birthday. In celebrating this event it seems appropriate, however, to recall that another publication in the same "family" of Simmons-Boardman railway papers marked its centennial practically a quarter century ago.

I refer to Railway Locomotives & Cars, then the Railway Mechanical Engineer, the first issue of which appeared as the Rail-Road Journal on January 2, 1832. It started when there was no railroad industry (only 200 miles of road built) and grew up with it. *Railway Locomotives & Cars is the oldest continuously published industrial paper in the country.*

This is neither the time nor place to review its history. That is a matter of record in the centennial issue of that paper (October 1932). It may be of interest, however, to observe that its founder, who was a newspaper man when he started the Journal, was later the pioneer publisher of specialized "class" (i.e., trade or business) magazines, of which he owned five in addition to the Journal; that he sold the Journal in 1849 so that he could join the California gold rush; and that, on two occasions in the paper's history, its shadow and those of two predecessors of the present Railway Age brushed each other before the Journal and Railway Age became members of the same family.

Late in 1886, three years after he had sold his interest in the Railroad Gazette to W. H. Boardman, M. N. Forney became the publisher and editor of the Journal.

Up to that time there had been three separate phases in the Journal's career.

During the first 17 years its objective was to stimulate public interest in the growth of railway transportation in the United States. For the next 30 years it was preoccupied with the management of railway financing and the interests of investors. Its attention was devoted also to the questions at issue between the railroads and the public, and the railroads and their employees. Finally, during Mr. Forney's regime, the Journal took on its character of a motive power and rolling stock paper, which it has continued to be during the 70 years since Mr. Forney shaped its policy.

The next touching of shadows with Railway Age occured when Roy V. Wright left the editorship of the then American Engineer & Railroad Journal to join the staff of the Railway Age Gazette in 1910. A year later the contact became more than shadow when the two papers became members of the same family and Mr. Wright resumed the editorship of the Journal.

Railway Age is just a youngster!

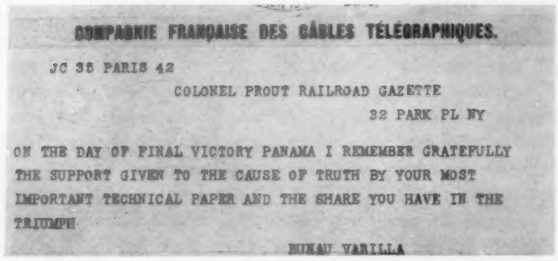
C. B. Peck

Editor (retired), Railway Locomotives & Cars

FRONT COVERS at the turn of the century consisted wholly of small ads—like today's British newspaper. Railway Age, above, was 8 by 12 in.; Railroad Gazette was 10 by 15 in. Both were printed on yellow cover stock.

Best of the Editors—Crusaders All

FRUIT OF POWER OF THE PEN



COMPAGNIE FRANÇAISE DES CÂBLES TÉLÉGRAPHIQUES.

JC 36 PARIS 42

COLONEL PROUT RAILROAD GAZETTE

32 PARK PL NY

ON THE DAY OF FINAL VICTORY PANAMA I REMEMBER GRATEFULLY THE SUPPORT GIVEN TO THE CAUSE OF TRUTH BY YOUR MOST IMPORTANT TECHNICAL PAPER AND THE SHARE YOU HAVE IN THE TRIUMPH

BUNAU VARILLA

Credit for major role in decision of the U.S. Congress to select Panama, instead of Nicaragua, as the route for the Isthmian Canal was cabled on March 18, 1903, from Paris, to the Railroad Gazette and its editor, Col. Henry G. Prout, by the famed French engineer, Bunau Varilla. Because the canal was a major engineering project, Prout attacked vigorously what he considered the delusions and errors of the Nicaragua route advocates.

Always behind a paper there is one man—the editor. He sets the standard of performance. Some editors have a personality which is merged with the personality of the paper and a passion for anonymity. Others are vigorous centers of activity outside the paper and leave their marks on the publication.

In the 100 years of Railway Age and its predecessors, the changes of fortune brought to its head all kinds of men of many humors and talents. It is difficult to single out those who excelled. The shifting sands of judgment obtrude.

Nevertheless, from all of the editors, six had a common characteristic—they were all crusaders.

HARRY P. ROBINSON

1859-1930

Founder of the Northwestern Railroader in 1887 and purchaser of the Railway Age in 1891, publisher and co-editor, Robinson was outstanding for his imagination. He was a born promoter. He wanted to see his paper serve the largest possible public and included thousands of railroad employees in the rank and file among his subscribers. He also gathered investors and brokers into his fold by printing stock quotations and financial analyses. In his early days he believed in regional papers, and established his first paper because he thought existing railway journals were not serving properly the interests of the roads or population of the then "Northwestern" states.

The accomplishment for which Robinson is best known is organization of the American Railway Engineering & Maintenance of Way Association (now American Railway Engineering Association and Engineering Division, AAR). He himself took the initiative in canvassing the readers of the field and made himself the catalyst which crystallized industry opinion leading to the foundation of this continuing important association.

Robinson sold out his interest in Railway Age in 1901 and returned to England, the land of his birth. Here he joined the staff of the London Times and had a distinguished career as a war correspondent—for which he was knighted by King George V in 1920.

Unfortunately, no existing likeness of this pioneer editor has come to light.

COL. HENRY G. PROUT

1845-1928

Distinguished civil engineer, a scholar, and a prolific writer and lecturer, this man also had wanderlust. For some years he engaged in engineering and administrative work for the Egyptian government in undeveloped lands in Africa. For this he was rewarded by being appointed governor of that country's so-called Equatorial Provinces.

Retiring in 1878, with the rank of colonel on the General Staff of Egypt's military forces, Prout entered the railway signal manufacturing field, resigning in 1887 to become editor of the Railroad Gazette.

An editorial by the colonel, read on the floor of the U.S. Senate, is credited with influencing the selection of Panama, instead of Nicaragua, as the route to the interoceanic canal.

Colonel Prout retired from the Gazette in 1903 to reenter the railway signal field. He was vice-president and general manager of the Union Switch & Signal Co.

His association with George Westinghouse while with US&S led to his selection as author of the official biography of the great inventor, sponsored and published by the American Society of Mechanical Engineers in 1921.

SILAS W. DUNNING

1838-1924

Joint owner and editor, Railroad Gazette, 1871-1887, conditions in railroading were chaotic when he took over the editorial chair. He set out immediately to provide guidance. At the time of Dunning's death, Arthur T. Hadley, then president of Yale University, and a former associate editor, said:

"The country needed a journal which not only gave the news regarding railroads but also explained the principles underlying good railroad management in a way to promote their adoption both by the companies and by the country."

Dunning directed the "battle of the gages" for the Gazette. He was instrumental in saving the country from the folly of the narrow-gage enthusiasts, who would have "Balkanized" the railroad network. His influence was strong in the shaping of the original legislation of 1887 creating federal regulation of the railroads.

MATTHIAS N. FORNEY

1835-1908

Co-owner of the Gazette with Dunning, and its associate editor dealing with engineering and mechanical matters until 1883, he was the designer of the Forney locomotive which was widely adopted for suburban and urban passenger service.

Forney was the moving force behind the important Master Car Builders Association and served as its secretary from 1882 to 1889. He was a member of the group of engineers who in 1880 founded the American Society of Mechanical Engineers.

He was a prolific inventor. Up to 1893 he had taken out 33 patents—most of them related to the locomotive cited, which was produced while he was associated with the Gazette. As a motive power engineer, the only patents from which he ever profited were the Forney locomotive and a few dealing with passenger car seats.

Forney long crusaded for standardization of parts.

WILLIAM H. BOARDMAN

1846-1914

Editor of Railroad Gazette, 1903-1911, Boardman, in addition, was also its owner, business manager, and publisher.

Born of a newspaper family, he joined the Gazette in Chicago in 1869. After the Great Fire of 1871 he moved with the paper to New York and bore the brunt of the struggle to put it on a paying basis.

In 1883 Boardman bought most of Forney's holdings. In 1887, buying Dunning's interest, he became president of the company, and remained its "mild and enlightened despot," until illness forced his retirement in 1911. From 1903 until that year, Boardman served also as editor.

While his editorship was neither showy nor brilliant, he may be remembered as pioneering a new conception of editorial integrity in the business press. He believed that, to be independent of improper advertiser pressure on editorial matter, a paper had to be financially strong.

At the same time, his chief interest was in seeing to it that the advertiser got his money's worth from his advertising. All his life he fought hard for effective advertising copy and display. He is entitled to be remembered, therefore, as a crusading editor.

SAMUEL O. DUNN

1877——

Editor of Railway Age, 1911-1949, and chairman of the board of Simmons-Boardman Publishing Corporation, 1931-1950, he started in the country newspaper business when he was 15 and was publisher of a weekly before he was 19. A self-taught scholar, he ultimately became editorial writer on the Chicago Tribune and a nationally recognized authority on railroad regulation. Less than a year after joining Railway Age, he became its managing editor.

During the 37 years through which Dunn was directly responsible for the editorial pages of the Railway Age Gazette and Railway Age, its voice was raised vigorously on behalf of many improvements in railroad transportation and for fairness in railway regulation as competition entered the field. Dunn was a powerful force in the fight to restore the railroads to private ownership after World War I. He did it by winning the support of the public.

He was in much demand as a lecturer on these subjects before colleges and universities and was the author of several books, among them "Regulation of Railways," published in 1911, and "Government Ownership of Railways," published in 1915.

Dunning's holdings, beginning in 1883.

From the Kellogg period through to its merger with Railway Age, the Gazette fought fearlessly for what it thought to be right. Frequently it criticized the industry upon which it depended for its life, in a manner which no businesspaper today would dare. It castigated individual railroads—by name—for what it considered gross negligence in providing crossing protection or block signals, and did not fear, for example, to call the powerful Vanderbilts life-risking pennypinchers for not so protecting their properties.

Week after week it told stories of loss of life caused by continued use of link and pin couplings and old-fashioned "man-killing" buffers, and kept up the barrage until the automatic, vertical plane coupler was adopted. It scolded top management for not paying its operating officers more generously. If it did not encourage the formation of the brotherhoods, it did not oppose them; and frequently took the side of rank-and-file employees in disputes—especially when safety or good service were at stake. It kept pounding at the necessity for railroad officers to find facts, and not rely on hunches and "things they learned while young which are no longer so."

For years the Gazette published weekly letters to the editor signed by "Hindoo." They were highly critical of all kinds of current practices—including dispatching methods, advertising, timetables, employee relations, shop facilities, and boards of directors. The identity of the writer was never revealed, but so long and frequent were the letters that he might have been the editor himself. Why, if true, he chose this medium is baffling; he showed no shyness whatever in the rest of his paper.

Why was the Gazette so bravely outspoken? Probably because it grew up when there was no regulation of railways—when they were a monopoly, and before they understood the public interest. The only regulation in the country was that provided by the Gazette itself.

The Gazette was fair-minded. Although it opposed bitterly the narrow-gage enthusiasts, it gave their proposals full publication in its pages, itself assuming the expense of engravings with which to illustrate them. Co-editor Forney had obtained a patent on a special tank locomotive for rapid transit service, yet the Gazette gave top feature treatment, with illustrations, to a rival design by the superintendent of the New York Elevated Railroad.

The "Age"

The other line of descent of today's Railway Age began in Chicago in 1876, 20 years later than the Gazette, and some five years after the latter had moved to New York. From the beginning it was called Railway Age. Its course was guided at first wholly by E. H. Talbott. Two years later Talbott assumed presidency of the company publishing the paper and became its co-editor, along with Horace R. Hobart. Responsibility for the conduct of the Age rested with these two men for 15 years. From the beginning they defined their audience as railroad managers and investors and their natural source of advertising as that of companies supplying the railroads—although they accepted, and received, freight, passenger and land-sales advertising from the railroads.

A weekly, as was the Gazette, the Age was not then as vocal as to its objectives, but it became a lively chronicler of events and developments in the railway field. Its tone was lighter than that of its older rival. It dealt less consciously with the science and art of conducting transportation and leaned more to the business aspects of railroad management. It was edited for other employees of the railroads as well as officers. It attracted a large volume of advertising which numbered upward of 20 separate insertions in each issue published during its first year.

Meanwhile in 1887, in the Twin Cities of Minnesota, one Harry P. Robinson established still another railroad paper—the Northwestern Railroader. Its publication was intended to serve the interests of the railroads in the Northwest, a territory which the founder believed had been neglected by the railroad papers of more general territorial coverage.

That paper served a wider range

Contrast in Pen-and-Ink

THE TRAGIC

AMPUTATION: occupational hazard of the trainman described in a Railway Age of 1891, with title of: "The Element of Use After Amputations—Examples of Gratifying Results from Conservation in Surgery."

THE HUMOROUS

ON "LATERAL MOTION," from Railway Age's "Dictionary of Technical Terms"—1892. It once poked fun at a rival "weakly" portraying its editor as a silly fellow—Definition: "Journal Brass."

of interests in the railroad business than either of its main contemporaries. It went even farther than the Railway Age in giving voice to the lower ranks of railroad men. Like the Railway Age, it printed stock quotations of the properties in its territory.

In 1891 Robinson bought the Railway Age and combined it with his Northwestern Railroader. The publication was known as the Railway Age and Northwestern Railroader for a few years, but soon dropped the latter name from the title and continued as the Railway Age. With Robinson as publisher and co-editor, the Railway Age took on "color." During the early nineties the amount of humor introduced into the columns of the paper increased noticeably. It looked at railroading with more spirit of adventure, and with less of grim purpose, than the Gazette. Advertisers liked it. At time of the purchase, Robinson named himself publisher and co-editor as well, sharing the responsibility for the contents of the book with Hobart.

Hobart is reputed to have been a man of high character. During his editorship, however, there were no crusades or other outstanding accomplishments to add color to his career. He retired as editor in 1898 but continued as an editorial contributor until 1908.

Robinson severed his connection with the Railway Age in 1901 and returned to England. He was succeeded as editor by Daniel Royce.

Merged Papers

In 1908, E. A. Simmons, then vice-president—advertising of the Railroad Gazette, saw a chance to buy out Railway Age, which he termed "our strongest competitor." He cabled President Boardman, who was in Europe, that he could close the deal if Boardman would raise half of the total sum of $265,000 involved. Boardman cabled: "Go ahead," and the sale was consummated.

While, prior to the merger, the Gazette had the greater prestige, it was losing ground in circulation and in advertising to its livelier, more enterprising Chicago rival. Boardman himself admitted that the Gazette was "edited for student railroad presidents and there were never enough of them." He complained privately that, in later years, too many of its editorials were "confidential memos from the editor to the proofreader."

The combined paper — at first titled Railroad Age Gazette — reflected the character of both ancestral lines. It retained the Age's alertness to the news of the industry. It continued the thorough exposition and interpretation of technical aspects of railroad operation which it had inherited from the Gazette.

Altogether it was a stronger paper than either and began at once a steady climb in circulation and advertising revenues. Starting out with about 4,000 subscribers on the Gazette and the Age apiece (many of which were duplicating), it pushed circulation to 10,000 by 1929—despite its policy of limiting promotion of sale of the paper to readers of railway officer status.

In 1912 Simmons bought out Boardman's holdings and thus became the owner of a safe majority of the Simmons-Boardman Publishing Corporation. Simmons had been engaged in every department of the publishing concern, having started at $5 a week as a reader of newspaper clippings for the news editor of the Railroad Gazette. He had financed his ownership in the company from loans freely offered him by advertising clients—which were then the basis of larger bank loans when he took the big plunge in 1912.

Samuel O. Dunn was managing editor of the Age at the time of the merger. He was made western editor of the combined papers. Three years later when Boardman retired, Dunn succeeded to the editorship, keeping his headquarters in Chicago, although the company was directed from New York. During the 37 years through which he was directly responsible for the editorial pages of the paper, its voice was raised vigorously in behalf of many improvements in railroad transportation and for fairness in railroad regulation.

As the highest paid business paper editor in the U. S. and with the largest editorial staff of any technical journal existing, Dunn introduced what was then a new attitude toward editorial staffs. Although he had himself neither technical nor railroad experience, he chose as his editors men who had received technical education in leading universities and who had had railroad experience. For example, Elmer T. Howson, who was responsible for engineering copy until his death in 1944, had been a division engineer on the Burlington and served as an officer of the American Railway Engineering Association for many years.

The late Roy V. Wright, who handled mechanical matters, as well as serving as managing editor, had been mechanical engineer of the Pittsburgh & Lake Erie and was a national authority on shop techniques. Wright served as president of the American Society of Mechanical Engineers in the thirties.

Public Relations Side

When Dunn took over, railway papers in general were almost exclusively technical. Having made himself a recognized authority on regulatory problems, he concluded that railways were confronted with a problem that surpassed all their technical difficulties—namely, public ill will, evidenced by bitter attacks upon them, even by business interests, and by crippling regulation.

He therefore broadened the paper's scope and began to hammer home forcefully the evil effect of bad railroad regulation and government ownership. These arguments were given wide distribution in the daily press. At the height of this activity, it was reckoned that papers with a combined circulation of more than four million were regularly printing items quoted from Railway Age or its editor. Dunn, however, never allowed his interest in the subject of regulation to overshadow what he considered the primary function of Railway Age—a weekly news magazine about all phases of the industry—including the technical.

The name Railroad Age Gazette shortly was changed to Railway Age

Gazette, and finally in 1918 the title was shortened to Railway Age.

In World War I Railway Age had the opportunity to perform perhaps the most important service in its history. First, it did everything in its power to prevent government control. That it did not succeed was due largely to the fact that the priority system for handling traffic tangled up the roads in hopeless confusion.

Wartime Service

During the critical months after this country got into the war, Editor Dunn moved to Washington and remained there until several months after the railroads were "McAdooized." When the government did take over, Dunn predicted that the railroads would surely return to private ownership because McAdoo would get them into such a state that the country would be glad to return them to their owners.

Dunn's prophecy proved true, but it was not so easy to get the railroads returned. Organized labor, some investors and government bureaucracy strove mightily to keep the railroads in government hands permanently. Because they operated their properties under government control, most railroad officers had to remain silent on the issue.

Oldtimers say that Railway Age's articles and editorials—widely disseminated to the public—did more than any other agency in proving the folly of government ownership and forcing the roads' return to their owners in 1921.

In the mid-twenties, the editors of Railway Age conceived the idea that the railroads ought to get into the highway transportation field. Beginning in February 1926, they published a "Motor Transport Section" appearing in the fourth issue of every month. This feature was operated like a separate magazine, and had its own editorial staff who specialized in truck and bus operations. The section was discontinued in May 1938, because, by this time, it was clear that the railroads' use of motor vehicles was to be limited to supplementary roles and that they would be barred from truly effective use of this instrumentality by regulatory policy. As a result, the usefulness of this section was too limited to justify its expense. Had the railroad acted upon the advice and urgings of the Motor Transport Section before the right to make a profit on the highways had been handed by regulation to other interests, the history of the railroad business might have been different.

The Railway Review

In 1927, Simmons-Boardman purchased the weekly Railway Review and absorbed it in Railway Age. The Review, founded in 1868, had a long career of honest, industrious publishing under its founder and sole publisher, Willard A. Smith, but it failed to achieve the prestige of Railway Age and exhibited no strong editorial leadership for the industry. It is not generally considered, therefore, a "blood line" ancestor.

Simmons died in 1931, after having extended the company's properties to include businesspapers in the building, marine and aviation fields, the latter being dropped in 1931. With his death, active direction of the company passed to Dunn, as chairman of the board.

Railway Age early recognized the necessity for an improvement in freight service if the railroads were to hold their rightful share of freight traffic. Commencing 1940, the Age produced an annual issue titled, "Freight Progress," in which improved services of the railroads were enumerated in as specific a fashion as was possible, together with a discussion of mutual problems of railroads and shippers. This issue was distributed to important shippers of the country.

Having proved to its satisfaction that editorial matter about railroad services would interest shippers, Simmons-Boardman began publishing a new monthly magazine, Railway Freight Traffic, in January 1953. This periodical now has a circulation of 7,000 industrial traffic managers and has proven particularly successful in its discussion of controversial matters.

Upon Dunn's retirement in 1950, James G. Lyne, who had been co-editor for two years, became editor of Railway Age and president of the Simmons-Boardman Publishing Corporation. With a background of both railroad and newspaper employment, Lyne had participated in most of the editorial activities of Railway Age, before heading up the masthead. As a graduate economist, he recognized, early in the thirties, that classical rate-making and rate regulation were losing the railroads traffic to which their cost characteristics clearly entitled them.

Back even then, he introduced a series of articles written by an industrial traffic manager, which questioned the value of classical rate-making. World War II, however, so increased the railroads' traffic that the pioneer interest he had aroused was dissipated. It has not been until the past few years that the industry itself has recognized the necessity of a complete recasting of rate-making principles.

In 1954 controlling interest of Simmons-Boardman Publishing Corporation was sold to a group of long-time empyloyees of the company. The Railway Age and its associated papers are now owner-operated properties—the principal stockholders being President Lyne and Executive Vice-President Arthur J. McGinnis—both of whom started with the enterprise as associate editors of Railway Age. Robert G. Lewis, also a former associate editor, was named publisher of the company's railway group on January 1, 1956.

Promise for the Future

When the Western Railroad Gazette first hit the mails in November, 1856, the railroads about which it wrote were described as "an active and trouble-prone industry."

They are so still.

Starting its second century, Railway Age looks forward to the task of reporting the vital news about the railroads and their suppliers in a meaningful way, every week. That news will include, of course, the much faster pace of technological change which lies invitingly ahead. Railway Age will continue to serve as its has since the transformation of the Gazette in 1870—a reporter of "technics"—including the non-engineering technics like operations and marketing.

And it will keep crusading. The pages which follow show some of the subjects about which, it is expected, considerable and continuous hell will be raised. **END**

Readers of the Dailies: Conventioneers of 1894

Important "brass" attending the annual convention of the American Railway Master Mechanics Association at Saratoga Springs, N.Y., were given identifying numbers on photo found in Railway Age's files. They were: (1) G. W. Smith, (2) Jacob Johann, (3) W. S. Morris, (4) C. H. Cory, (5) M. J. Drury, (6) A. E. Manchester, (7) George Westinghouse, (8) J. F. Deems, (9) J. E. Buker. Westinghouse was the industry's technological titan.

Daily Editions Since 1887

Daily editions of businesspapers published in connection with important conventions of the industries they serve are fairly common. Their production generally signifies an alert and capable staff.

The Northwestern Railroader, a Railway Age ancestor, was the first technical businesspaper to publish daily editions in connection with industry meetings. In the very year of its founding—1887—its energetic publisher, Harry Robinson, achieved the difficult task of publishing two magazine-size, extra, daily issues during each of two successive weeks during the summer, covering the annual sessions of the Master Car Builders and the American Railway Master Mechanics Associations, respectively, held consecutively in Minneapolis and St. Paul.

These associations—now embodied in the Mechanical Division of the Association of American Railroads—had the task of hammering out standards for cars and locomotives. Upon the work of the car builders depended the ability of the North American railroads to interchange their freight car equipment universally, and their passenger equipment in great measure. Setting standards for motive power affecting safety and efficiency was the accomplishment of the master mechanics. Hence, their annual sessions became the most important gatherings in the railroad business.

Furthermore, the growing buying power of their members attracted large numbers of suppliers to the convention cities, well-heeled and generous of entertainment — which "steel car" Diamond Jim Brady inflated to a level of luxury never attained before or since. Fortunately for the business of railroading, the suppliers were equally generous in showing and demonstrating their products; a large-scale exhibition of equipment was an annual event until 1920.

In 1892, within a year of the merger of the Northwestern Railroader and Railway Age, the combined papers, under Robinson's leadership, published seven daily editions during the annual meetings of the two mechanical associations at Saratoga Springs, N.Y. Since most of the committee reports were published in full in regular weekly editions, the dailies were devoted to a full stenographic report of the proceedings.

Thenceforth, daily editions were published by the Railway Age annually at Saratoga, and later at Atlantic City, N.J., through 1916, in 1919 and in 1920; thereafter every two years until 1932; then in 1937, 1947 and, most recently, 1953. The deliberations of the Purchases & Stores Division, AAR, were covered simultaneously in the last three years.

After the first few years, the Dailies took on the character of full-scale magazines, in which were printed not only the transcript of the proceedings, but abstracts of committee reports as well. Successive years brought, too, more pictures of items on exhibit and news stories and photos about personalities and social events. Ultimately, intensification of the associations' business docket and changes in readers' wants induced the editors to undertake the difficult task of "editing down" the transcript.

The roadway side of the railroad business got its Dailies too. In 1910, 12 years after the organization of the American Railway Engineering and Maintenance of Way Association, the Railway Age Gazette began the publication of Dailies during the annual

DAILY EDITIONS SINCE 1887 (Cont.)

meetings of its successor, the American Railway Engineering Association. Four Dailies were published each year during the week of its annual meeting, held in Chicago, from 1910 through 1932. These engineering dailies published both committee reports and transcripts of the meeting. In the twenties, Associate Editor Layng's "Rollo and His Pop" series, accompanied by cartoons, daily josh-ed the engineers by name, and introduced a new technique into business journalism.

Skin of the Teeth

Obviously, the production of large daily magazines by the staff of a weekly technical journal, working away from home and their regular printshop and in a convention atmosphere (where, to the poor reporter, "no man is at the address he gave or ever stays put") is a job of intense pressure — where editorial, business and circulation have to work closely together or fail ignominiously. Contracts with advertisers generally called for early morning delivery every day at convention hotels and failure was unthinkable.

But it sometimes hovered close. During one of the first mechanical conventions held in Atlantic City, copy sent to the paper's contract printshop in Philadelphia, 55 mi distant, went astray and had to be duplicated. Compositors and pressmen worked frantically to overcome the delay. Nevertheless, to get the copies to the convention on time required that Bill Horton, circulation manager, hire a horse cab and dash to the Camden ferry to make the only early morning train to Atlantic City. Then, as now, the Quaker City was short of cabs; the only one in sight contained a slumbering drunk. Horton so plied the cabby with eloquence and cash, however, that the latter consented to allow the inebriate to be quickly pulled from the cab and gently deposited alongside a sheltering building wall, with $5 of the Age's conscience money deposited in his pocket. The victim's place in the vehicle was taken by bundles of Dailies. The cab made the train connection ferry just as the morning light showed its face to the east—over Atlantic City, where trusting advertisers slumbered still.

Trouble of a similar sort cropped up in 1947. This time a printshop "snafu" made it clear that the sole early morning train would be missed —cold. To Philadelphia, in the middle of the night, was dispatched Electrical Editor Oehler. He owned the only fast automobile around and, withal, was the only man intrepid enough to keep the pedal on the floor boards.

His westbound journey was without incident. On the return, however, loaded with Dailies and doing 87, he ran afoul of an early rising constable in a small town.

Disaster loomed. The constable was quite unimpressed by the educational value of Railway Age Dailies. Oehler was not only to be fined, but, worse, he was to be detained by the determined, German-born officer. Fortunately, the constable was impressed by Oehler's name and it was necessary only to dredge up an authentic "kraut" accent from a Wisconsin boyhood to change the course of justice.

Result: The Dailies were on time.

Mileposts of Editorial Strength

All businesspapers serve three main functions for the business or industry they serve. They disseminate the news of the industry, thus keeping those engaged in it aware of the trend of events. They stimulate the thinking of the industry by the publication of articles of exposition and analysis. They assume leadership in the advocacy of specific courses of action during crises in the life of the industry.

The first two of these functions are the work-a-day occupation of the publication. Critical situations calling for the advocacy of specific courses of action do not occur every week—or even every year. When they do occur, however, they offer the opportunity for the exercise of leadership which, if it is to be effective, calls for persistent advocacy until the issue is settled.

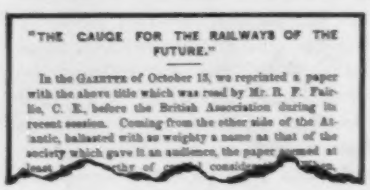
To Railway Age during the past 100 years, circumstances offered many such opportunities—in connection with which its leadership is credited with having exercised a decisive influence.

"BATTLE OF THE GAGES"

During the early seventies the question whether a single track gage, or a variety of widths, would prevail became a subject of heated debate. Either standard gage or five-foot gage were advocated for heavy traffic main lines—and a 3-ft 6-in. gage for lines on which traffic was light.

Almost single-handedly the Railroad Gazette opposed the idea of a multiplicity of gages. As in other controversial matters, it was fair-minded in its presentation of the news of both sides of the question. It gave much space to R. F. Fairlie, a Britisher who advocated narrow-gage roads, and to his "Janus" type tank locomotive with double engines and boilers with fireboxes in the center.

Editorially, however, the Gazette advocated the establishment of the standard 4-ft 8½-in. gage because this was the prevailing gage. It contradicted the rather general opinion that a narrow-gage line was appreciably cheaper to build for light traffic than a light standard-gage line; it insisted that the latter could be up-graded for heavier traffic when occasion required, at no additional expense for rebuilding, and that the expense and inconvenience of the transfer of traffic at change-gage


"THE GAUGE FOR THE RAILWAYS OF THE FUTURE."

In the GAZETTE of October 15, we reprinted a paper with the above title which was read by Mr. R. F. Fairlie, C. E., before the British Association during its recent session. Coming from the other side of the Atlantic, ballasted with so weighty a name as that of the society which gave it an audience, the paper seemed at least

points would offset the advantage of a light narrow-gage line, if any. This campaign emphasized the lack of economic justification for the narrow-gage line and the need for a single track gage to avoid the strangulation of commerce in a rapidly growing nation of vast territorial extent. The Gazette's campaign eventually was successful.

STANDARD BOLTS AND NUTS

In the early decades of railroading, practically all rolling stock and components were custom-built. Few or no parts were interchangeable. Each shop even set its own standards for the thread size of bolts and nuts. During the decade starting the middle of the 1870's, the Gazette, by publication of "as much as would make a book as large as the New Testament, or larger," helped establish standard threads and bolt sizes in this country.

In an editorial of May 1, 1875, it said:

"We wish it were possible to make a non-mechanical man, as most railroad presidents and superintendents are, understand the very great inconvenience which results from the fact that the parts of cars are not duplicates of each other. Take, for example, bolts and nuts. . . . A ¾ bolt in one car will be a thirty-second larger or smaller in diameter than another. One will have a screw with 10 threads, another with 9 and another with 11 or 12. The result is that the mechanic must either force on a nut which does not fit, and thus incur the risk of another breakage, or else he must waste time in getting a bolt or nut of the right size and proportions."

THE AUTOMATIC COUPLER

Failure of the American railroads to obtain and to install a coupler which would enable a man to couple and uncouple without going between moving cars, caused frightful toll of life and limb of trainmen. Starting in 1870, the Gazette pounded out story after story of the horrors caused by the link-and-pin, naming roads by name. It encouraged inventors to come forth with practical improvements on, or substitutes for, the existing coupler; urged the roads to test them all; then shamed them into installing them.

In 1877, when Janney's vertical plane automatic coupler was being introduced, the Gazette encouraged the railroads to test it, writing: "Every friend of humanity must feel like hastening the day when some efficient self-coupler will come into general use."

Finally, in 1884, the Master Car Builders Association adopted a resolution stating "It is the opinion of this convention that the best coupler mechanically is one that performs coupling along a vertical plane, so that after it might be generally introduced, there would be no further use for the link."

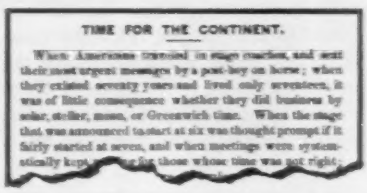
The next year the MCB selected 42 coupler designs—out of some 3,100 for which patents had been sought or obtained—and gave them a careful test. In 1887, the Janney design was adopted as standard for freight cars suitable for interchange. Subsequently the Janney also replaced the Miller hook type once common on passenger train cars. While it took some years for the automatic coupler to become universal, the effect of its acceptance and encouragement was an immediate and drastic cut in the maiming and killing of trainmen—who no longer wore stubs of fingers as a badge of office.

STANDARD TIME

On November 18, 1883—"the day of two noons"—all the railroads put their clocks on a zone system of standard time. Prior to that, the only time that existed in the country was local, commonly called "sun time," based—generally—on the transit of the sun.

The relationship was "general" only, because observance of true sun time was rarely feasible. Frequently the market city set the time for its tributary area.

Local railroads set the time for whole areas. The Pennsylvania, for example, used Philadelphia time everywhere on its lines—five minutes slower than the New York time of the Central and five minutes faster than the Baltimore time of the B&O. When it was noon in Chicago, it was 12:31 in Pittsburgh. There were at least 68 different "times" used by the railroads.



TIME FOR THE CONTINENT.

When Americans traveled in stage coaches, and sent their most urgent messages by a post-boy on horse; when they existed seventy years and lived only seventeen, it was of little consequence whether they did business by solar, stellar, moon, or Greenwich time. When the stage that was announced to start at six was thought prompt if it fairly started at seven, and when meetings were systematically kept [illegible] for those whose time was not right,

In its issue of April 2, 1870—the very first under its new title and editorial policy—the Railroad Gazette urged the railroads to take the lead and introduce "a standard time for the continent." The Gazette's own contribution to the problem left considerable to be desired. It advocated that the true sun time of a centrally located city (like St. Louis) be made the "time" for all parts of the country—even if a farmer in Maine had to rise at 4 a.m.

The Gazette hadn't yet caught the idea of time belts; but it definitely recognized a big problem; and kept talking about it until the railroads did something about it. Action started with a meeting of division superintendents held in May 1872, for the purpose of arranging summer passenger train schedules. Here there was formed a permanent organization which was not only to introduce "standard time," but ultimately to bind the railways into "a more perfect union." This new association was known, successively, as the Time-Table Convention, the General Time Convention, the American Railway Association, and, finally, today's Association of American Railroads.

Charles F. Allen, managing editor of the Official Guide of the Railways, and secretary of the General Time Convention, worked unceasingly for his zone system of "standard time." He won in 1883, 13 years after the Gazette started a continuous editorial drive.

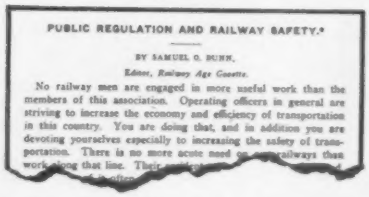
Public reaction to running the country on railroad time was mixed. There was the usual criticism that it was "agin' nature." One newspaper said it would rather run its clocks on "God's time—not Vanderbilt's." But the change made so much sense that the country went along with the scheme, almost without exception—although "standard time" was not made official by federal legislation until World War I.

THE SAFETY MOVEMENT

In 1910 the Railway Age Gazette initiated a campaign for the general adoption of a safety movement started on the Chicago & North West-

MILEPOSTS OF EDITORIAL STRENGTH (Cont.)

ern by R. C. Richards, general claim agent of that road. This was highly successful in spreading the Safety First movement. The continuing interest which the paper has had in the safety movement is attested by the fact that it won the National Safety Council's public interest award during each of the five years, 1948 to 1952, inclusive.



PUBLIC REGULATION AND RAILWAY SAFETY.*

BY SAMUEL O. DUNN,

Editor, Railway Age Gazette.

No railway men are engaged in more useful work than the members of this association. Operating officers in general are striving to increase the economy and efficiency of transportation in this country. You are doing that, and in addition you are devoting yourselves especially to increasing the safety of transportation. There is no more acute need on railways than

"RECIPROCITY" NUISANCE

Reciprocity in buying railroad supplies reached fantastic proportions in the late twenties—going so far as to involve a scheme by which groups of railway supply companies, seeking to increase their share of the market, bought the right from large shippers to route their traffic. Railway Age gave much space to both the Federal Trade Commission and the Interstate Commerce Commission hearings on this practice during 1930 and 1931, and over a long period, extending into 1935, waged an editorial campaign against the practice. This campaign was revived again in the forties.

For this job the Railway Age received personal letters of congratulation from a large number of purchasing officers and railway presidents, who commented favorably on its courage in handling this difficult and dangerous topic. Indications from letters received from managements which made some attempt to determine how much of the traffic promised could actually be delivered were that the actual yield from the practice in traffic was negligible.

THE STREAMLINER

The railroads suffered more from the Great Depression than most industries because they lost traffic not only from the decline of general business activity but by wholesale diversion to new competitors of what was left. This double tragedy tended to discourage their managements, and gave the industry a drab look.

Probably the most important single influence in reversing the unfavorable attitude of the public toward the railroads—and of management itself toward its future—was the introduction of the streamliner in 1934. This innovation wrapped up a new form of motive power, the diesel, with lightweight, stream-contoured, small profile trains—designed and decorated to attract attention and patronage.

Before the streamliner, there had to be years of development work—the gas-electric motor car; a lightweight trailer car which could be hauled by light power; a new concept of de luxe travel for coach passengers; and a desire for speed. All of these precursors Railway Age encouraged without stint. When the first true streamliners came, the paper recognized their importance as a symbol as well as a tool, and publicized them to the hilt.

Said Coverdale & Colpitts, in 1938, in a report on Streamline Lightweight High-Speed Passenger Trains: "Perhaps no instrumentality not directly engaged in the operation of railroad transportation has done more to promote and encourage the introduction of new types of passenger equipment on American railroads than has Railway Age." **END**

RAILWAY AGE'S TECHNICAL MONTHLIES

The publishers of Railway Age also produce three technical monthlies for railroad readers. They are, with dates of their original establishment:

Railway Locomotives & Cars —1832

Railway Track & Structures —1904

Railway Signaling & Communications—1907

Why?

In the old days of the Gazette and Railway Age it was the rule, rather than the exception, that the "Old Man" ran the railroad. He had many subordinates, but it was he who said when and how things should be run and decided what should be bought from what supplier to run them. The "Big Boss" dictated the policies and practices of his technical departments—"departments" more in name than in fact.

A single paper sufficed. Fred D. Underwood, when he managed the Soo (he later became president of the Erie), said: "The Railroad Gazette is the only paper worthy the name of such. The rest deal almost entirely with personalities and matters that are of no real benefit to the service, unless it be a benefit to tickle the vanity of railroad officials."

But things changed. By degrees technical officers on the roads were given more power and their departments expanded and divided into highly specialized units. Railroads became almost "industries within industries."

Shortly after the merger of the Gazette and the Age in 1908, their publisher decided to test the need for "packaged" technical editorial material. The first issue each month of the weekly combined paper specialized on mechanical department subjects; the third issue concentrated on roadway matters.

The test showed that there was strong demand for specialized material in one place. It also showed, however, that the interest of departmental men—as readers of specialized material—could not be held through the columns of one paper, because each department had a language all its own.

Hence, one by one, the publishers acquired existing monthly papers in the technical fields and changed and strengthened their editorial diet to complement that of the weekly Railway Age Gazette. The Signal Engineer was bought in 1910. The American Engineer & Railroad Journal was acquired in 1911; the Railway Master Mechanic in 1916; and the Railway Electrical Engineer in 1915—the three eventually being consolidated into the present Railway Locomotives & Cars. Railway Engineering & Maintenance was brought into the family in 1916.

MaK

DIESEL LOCOMOTIVES

UP TO 2000 HP

100 years ago when the Technical Review "RAILWAY AGE" was founded the MaK did not exist but

60 years ago the decisive and leading engineering for heavy machine building began on drawing boards as well as in the workshops in Kiel.

Since

45 years Diesel locomotives and Diesel railcars are built in Kiel besides engines for ship-propulsion and stationary purposes.

35 years ago the world's first 2000 HP Diesel locomotive for a combined passengers and goods service – at that time with hydraulic mechanical transmission – was built there.

35 years ago the building of Diesel hydraulic locomotives started by which the name MaK is now known all over the world.

Since

18 years engines up to 2000 HP are manufactured and multiple-locomotives up to 6000 HP produced.

Since

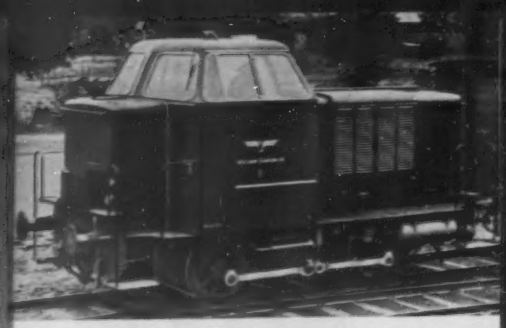
8 years – when the enterprise was refounded under the name of MaK – Diesel locomotives have been delivered to 4 continents and have been steadily purchased by State- and Private-Railways, Mines, and other Industrial Companies.

Researches of scientists, knowledge of the engineers, and commercial daring courage are united in a product of international importance.

Diesel locomotives of mature design

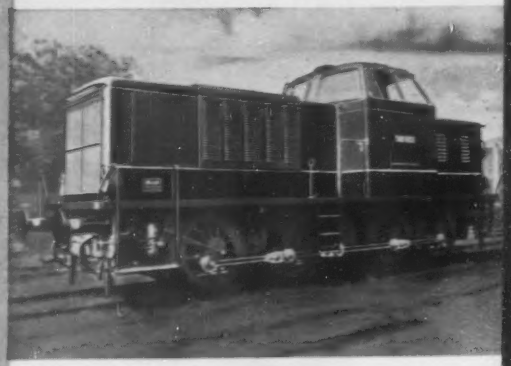
Made at Kiel

West Germany



Diesel-hydraulic locomotive type 240 B

Diesel-hydraulic locomotive type 400 C



Diesel-hydraulic locomotive type 600 D

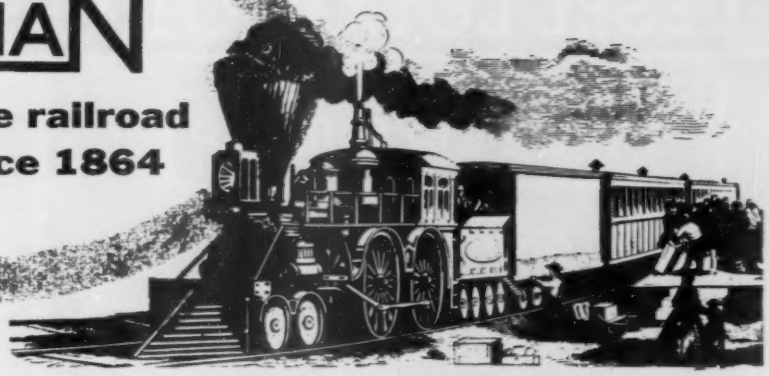
Diesel-hydraulic locomotive type 800/1000 D

Diesel-hydraulic locomotive type 1300/1600/2000 B B

MASCHINENBAU KIEL AKTIENGESELLSCHAFT

NATHAN

...serving the railroad industry since 1864

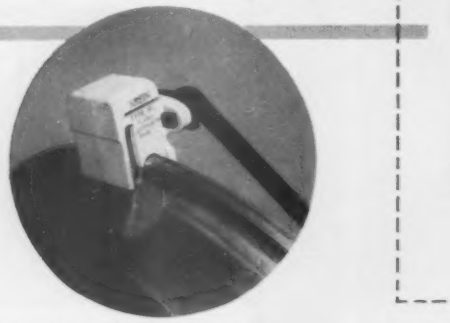


92 years ago Nathan entered the railway field manufacturing grease cups for locomotives, the first in a long series of products for the industry. We've been telling readers of Railway Age about our products for exactly fifty years.

Today as always, Nathan looks ahead to the needs of tomorrow, designing and manufacturing equipment that meets the highest standards of quality and endurance. Solving specific railroading problems, Nathan products have become standard equipment on leading lines throughout the country.

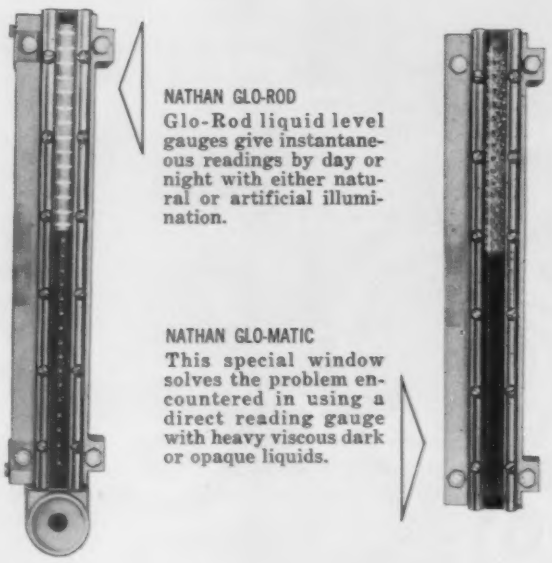
NATHAN AIRCHIMES

Their clear, bell-like tones provide Diesel power with the pleasing traditional sound of the old steam whistle.



NATHAN FLANGE LUBRICATING SHOE

A constant, even film of solid lubricant is applied to critical areas of the wheel flange, virtually eliminating excessive cutting and wear of wheel flanges, track rails, frogs and switch points.



NATHAN GLO-ROD

Glo-Rod liquid level gauges give instantaneous readings by day or night with either natural or artificial illumination.

NATHAN GLO-MATIC

This special window solves the problem encountered in using a direct reading gauge with heavy viscous dark or opaque liquids.

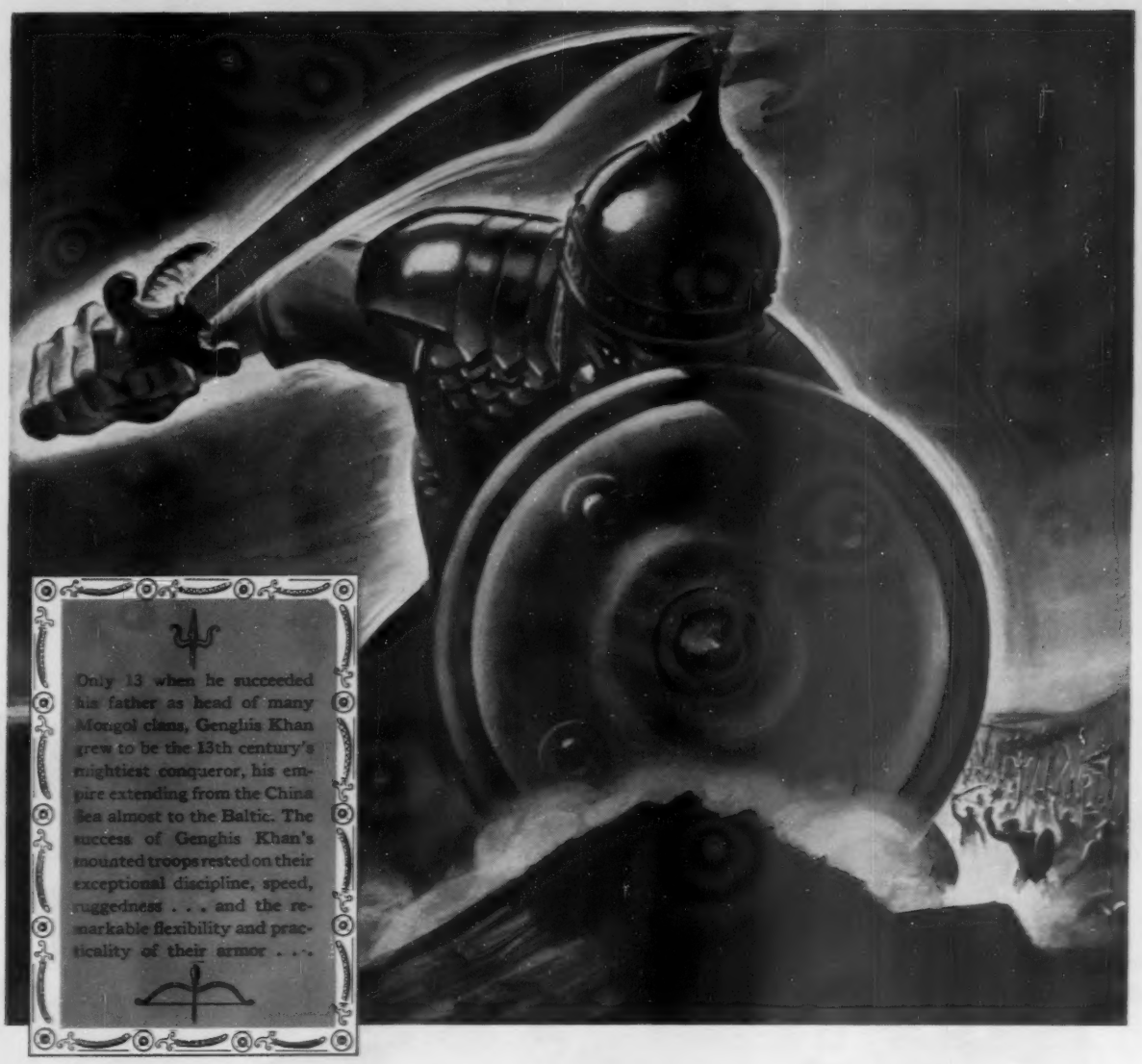
Complete information on any of these Nathan products is available upon request. Write today to Dept. RA.

NATHAN

Nathan Manufacturing Corp.

Manufacturers of AirChime Whistles, Glo-Rod Gauges and Lubrication Systems

45-02 DITMARS BLVD., LONG ISLAND CITY 5, N. Y.


Only 13 when he succeeded his father as head of many Mongol clans, Genghis Khan grew to be the 13th century's mightiest conqueror, his empire extending from the China Sea almost to the Baltic. The success of Genghis Khan's mounted troops rested on their exceptional discipline, speed, ruggedness . . . and the remarkable flexibility and practicality of their armor . . .

PROTECTED... against constant enemies

Flexibility and *practicality*, important characteristics of armor in Genghis Khan's day, can refer as readily to a modern-day kind of protection—Kerite Cable's never-equalled, never-surpassed insulation. Moreover, Kerite's endurance and resistance to constant attack truly would be a credit to one of those intrepid 13th century Mongol guardsmen.

Kerite Cable has to stand the test of not one enemy, but many—not for days or months, but for 30, 40, 50 and more years. Water, heat, cold, sun, deteriorating elements, time itself—these and more find Kerite an invincible opponent.

Wherever it is used, the world over, Kerite performs perfectly, lasts almost indefinitely. That is the reason wise buyers specify it.

The value and service life of a product can be no greater than the integrity and craftsmanship of its maker.

Founded 1854

KERITE CABLE

THE KERITE COMPANY—30 Church St., New York 7, N. Y.
Offices also at 122 S. Michigan Ave., Chicago; 582 Market St., San Francisco;
3901 San Fernando Rd., Glendale 4, Calif.; 31 St. James Ave., Boston

How old is

Norfolk and Western
118 years and 10 days old
on the 100th Anniversary
of Railway Age

Norfolk

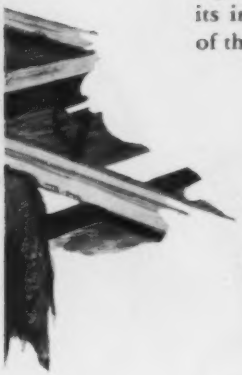
a way of life?

It has been said that railroading is a way of life as much as it is an industry, and in the century since the founding of Railway Age the railroads have become an indispensable part of the nation's economy.

From the beginning, the American railroad has been a symbol of man's struggle against distance, of his attempt to forge a new nation from a raw continent. Americans realized that the future vitality of their land depended upon an effective network of rails linking coast with coast, border with border, mine and factory with farm and city. The story of their efforts to meet this challenge — and having met it, their ceaseless efforts to meet new ones — is one of the most colorful chapters of our history.

In 1856 when the fledging railroad industry was on the threshold of its future growth, the first issue of Railway Age was published. Since that time, its influence has closely paralleled that of the industry it serves.

The Norfolk and Western Railway, already eighteen years old in 1856, is proud to be a part of the Nation's great rail system. In the territory it serves, the N&W has constantly sought to provide better rail service. During the last 10½ years the N&W has spent more than $267,000,000 for a better railroad plant "all along its line". Its fleet of modern locomotives and rolling stock . . . some of the world's finest roadbed . . . unsurpassed ocean shipping facilities at the Port of Norfolk . . . the latest in electronic traffic-control devices . . . these and many other outstanding accomplishments are convincing testimony to the N&W's past and present contributions to good railroading. And this progressive spirit will continue to be a way of life on the Norfolk and Western Railway.



100th BIRTHDAY

and Western Railway

In 1927—

mechanized track maintenance *started here!*

In 1927 the railroaders attending the Railroad Maintenance Equipment Show were amazed by the McWilliams Mole, *the first mechanized track maintenance unit.* In time this versatile shoulder and intertrack ballast cleaner showed the way to substantial cost savings for 31 railroads in the United States, Canada and 6 foreign countries.

From the McWilliams Mole are descended all of the track maintenance machines which today are making important contributions to railroading economy.

Railway Maintenance Corporation

PITTSBURGH 30, PA.

Designers and Manufacturers of: McWilliams Mole, Super Mole . . . McWilliams Tie Tamper, Crib Cleaner, Ballast Distributor . . . TieMaster . . . LineMaster. . . SpikeMaster . . . Tie Unloader . . . BoltMaster

these RMC **MACHINES** *Can Cut Costs For Your Road*

TIE UNLOADER

BOLTMASTER

TIEMASTER

SPIKEMASTER

McWilliams BALLAST DISTRIBUTOR

McWilliams TIE TAMPER

LINEMASTER

McWilliams SUPER MOLE

PS-1 mending: Monon style

Standardized design speeds repair and rebuilding

The concept of Box Car Standardization is ten years old. When Pullman-Standard engineered the PS-1 Standardized Box Car in 1946, every consideration for strength, durability, performance, shipper acceptance, low maintenance and low first cost that the world's largest carbuilder could contribute was included. The results were confirmed by railroad industry acceptance.

But an additional PS-1 benefit was not so obvious; a benefit which is becoming more and more appreciated by all PS-1 owning railroads, large and small. That benefit is the ease with which accident damaged PS-1s can be restored to like-new condition, with even limited shop facilities. This is possible because standardization makes PS-1s stronger to begin with and better able to survive wreck damage. And standardization's precision building allows new interchangeable Pullman-Standard parts to be installed to replace those damaged beyond salvage.

The Monon was selected to demonstrate the ease with which PS-1s can be mended. Monon shop facilities are adequate, and the know-how and skill of its mechanical department makes PS-1 repairs all-in-a-day's work.

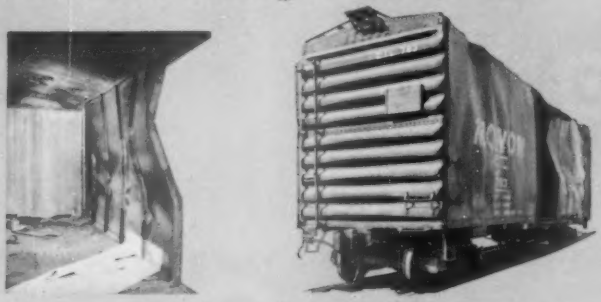
Monon 783, a PS-1 Box Car, was wrecked on a foreign line. It rolled over, coming to rest on its roof. Lading was a full car of canned goods. A lesser box car than a PS-1 would have been scrapped, but Monon 783 was sent home for repairs. How Monon craftsmen, aided by standardization, put this damaged car into like-new condition testifies not only to the ability of the Monon Shops but also to the unique repair-ability of the PS-1 Standardized Box Car.

MONON PS-1s survive wrecks

before THE WRECK . . . MONON 783

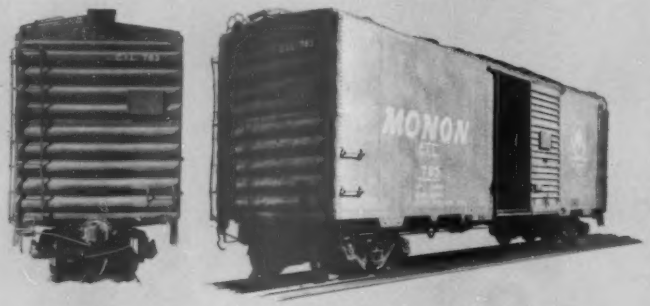
Monon 783, a Standardized PS-1 Box Car was built in December 1952. It had, therefore, been in hard general service for three years before it was wrecked in November, 1955. It is the 40'8" model PS-1, with a 6' door, welded sides, riveted ends and roof and all the inherent quality known to Pullman-Standard at the time it was built.

the wreck damage . . .

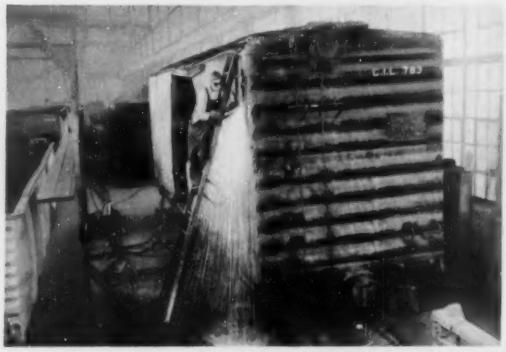


MONON 783 was part of a derail accident. The car left the tracks, slid forward off its trucks, rolled over and came to rest on the roof.

View of car interior, above left, shows severe side sheet crumpling with extensive deformation of side posts, side plate and door post. Despite this distortion, not a single side post-side sheet weld fractured or opened. Note that "B" end interior lining and floor are practically undamaged. Exterior, right above, shows progressive damage along one-half car length. Both "A" and "B" ends withstood damage and remained sound and straight. No weld unions of side sheet to side plate or to side sill parted, even where damage was most severe. All rivets remained tight.

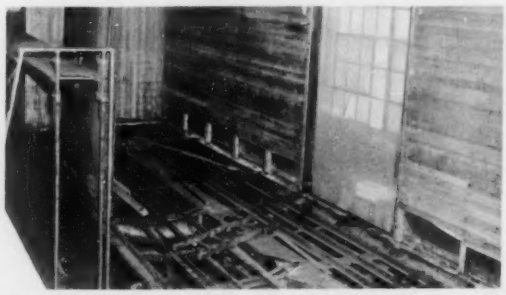


LEFT SIDE, PICTURED RIGHT ABOVE, remained unharmed with no evidence of damage. Roof sheets were crushed, but revealed no light leaks, tears, or broken seam caps or carlines. Examination of underframe showed alignment to be true, with damage to crossbearers and bolster bottom cover plates where the car body slid over the trucks. Monon car repair personnel stated that a wreck of this kind would normally damage an ordinary box car beyond economical repair.



the repairs . . . **MONON 783** was lifted and placed on blocks. Car segments damaged beyond salvage were cut out. This scene shows the ladder being burned from the car.

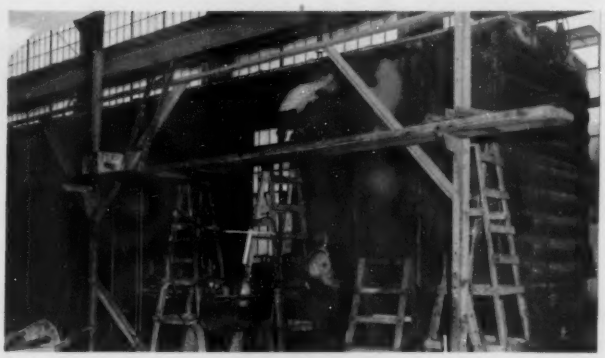
Ruined side and roof sheets were removed next. Note the top-to-bottom burns which cut sides into easily handled pieces, and the method used to support side segments with crane hooks.



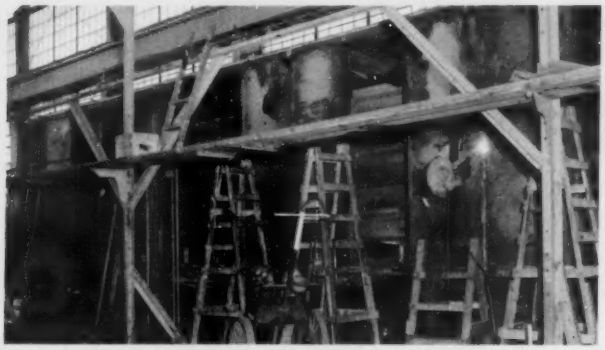
Here is No. 783 shorn of damaged sides and roof. Floor was removed to allow access to underframe. Repair process specified cooperage as part of returning No. 783 to like-new condition.

Crossbearer arms, deeply scored by wreck-contact with wheels, were burned off. Standardized replacements, obtained from Pullman-Standard, were merely welded into position on center sill . . . another benefit of the standardization concept.

thanks to STANDARDIZATION



Standardized roof and side sheets, P-S supplied, were next applied. Here side sheets are being positioned against standardized side posts. Such standard parts fit exactly, require minimum fitting and reworking.



Standardized side sheets are joined by arc welding after being butted together. Rivets attach ends and sides at corner posts. All standard parts used were obtained from Pullman-Standard and designed for fast, easy wreck repair.

the results... **MONON PS-1 NO. 783,** ready to go back into service. All damaged parts have been replaced or straightened. Interior has been reinstalled, and the entire car cleaned and painted with eye-catching new Monon styling and colors. Monon craftsmen stated that an ordinary box car damaged as extensively as PS-1 No. 783 would have been scrapped. Standardized PS-1 strength and construction, combined with PS-1 parts in the hands of skillful Monon car repair experts made reconstruction of No. 783 quick, easy and economical. This repair-ability of PS-1s is another of the inherent advantages of standardization which railroad owners are relying on for maximum performance and service from their rolling stock. Like the Hoosier Line, your railroad can avail itself of the many benefits of freight car standardization through purchase of any of the four types of cars in the P-S standardized line.

During the more than three years that have passed since Monon 783 was built, research, engineering, field inspection and production advances have made many PS-1 Box Car changes and improvements: A PS-1 built in 1956 is even better than one built in 1952. But Monon 783 is representative of the more than 80,000 PS-1s in service, since at the time it was built, it was the very best product of its kind and the best the world's largest car-builder could produce. The kind of carbuilding quality that allowed it to survive a serious wreck is reason why today nearly one-twelfth of all U.S. box cars are PS-1s.

PS-1 Box Cars are fabricated of completely tested and proved components that derive their strength from working together in mutual support. And because each detail of each component is thoroughly engineered and precisely made, car parts are interchangeable and fully standardized. This means P-S Roofs, Ends, Sides, Underframes and other components are readily available for application to wrecked PS-1 Box Cars like Monon 783. They are installed with minimum time, labor and normal shop facilities because they fit, thanks to standardization.

Similar railroad industry acceptance is being granted the other standardized freight cars in the Pullman-Standard line. More recently introduced than the PS-1, these units are developing comparable reputations for strength and performance: PS-2 Covered Hopper Car, PS-3 Open Top Hopper Car, and PS-4 all-purpose Flat Car. Each of these cars, like the PS-1 Box Car, is available to buyers with the benefit of design flexibility which permits choice of several sizes and the application of certain specialties and accessories to fit individual railroad requirements.

All P-S freight car products are the result of the shared experience of Pullman-Standard and its railroad customers. Engineered, tested, mass produced to the specified needs of the railroads and their shippers, standardized freight cars are the only rolling stock built with full consideration for the rigors of interchange to serve best on all parts of The Great American Railway System.

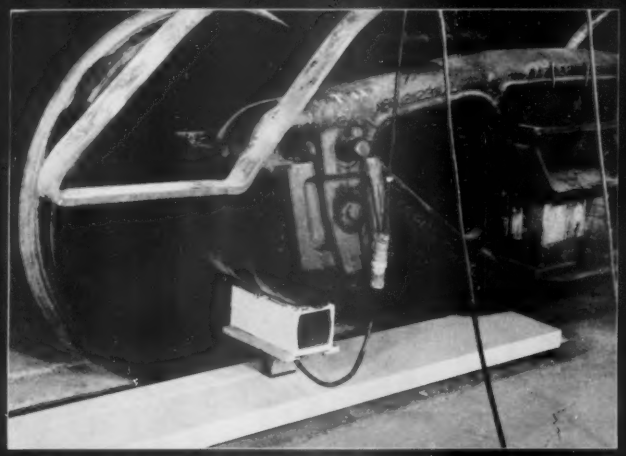
GREAT AMERICAN RAILWAY System
BY PULLMAN-STANDARD

WORLD'S LARGEST MANUFACTURER OF FREIGHT AND PASSENGER CARS

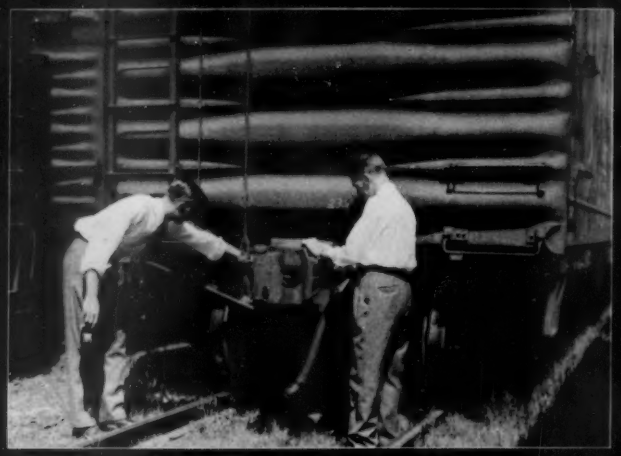
PULLMAN-STANDARD

CAR MANUFACTURING COMPANY
SUBSIDIARY OF PULLMAN INCORPORATED
221 NORTH LA SALLE STREET, CHICAGO 1, ILLINOIS
BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

how the Monon's standardized PS-1s were built



Research and Development tests of PS-1s are of infinite variety and number. For example, movies taken by a slow motion camera show actions and reactions the human eye can't see. This technique discloses what actually happens during impacting such as freight cars experience during running service and train make-up.



A corps of trained Field Service Engineers keeps a critical eye on service performance of PS-1s and other cars. Veteran cars as well as newly built PS-1s are thoroughly examined. Hundreds of detailed condition surveys each year make certain that PS-1s keep pace with railroad operating advances.

PS-1 parts, such as sides, are production line assembled as components before application to cars. Pullman-Standard production facilities build with such precision that even whole sides, such as this, swing smoothly into exact position and become an integral part of the car.

Pullman-Standard has invested millions of dollars in recent years to up grade production processes and keep PS-1 output in pace with railroad demand. Heavy investment has been made in dies, jigs and fixtures which facilitate precision building by expert craftsmen and give buyers better cars at lower first cost.

Built to serve best on the

GREAT AMERICAN RAILWAY SYSTEM

WORLD'S LARGEST MANUFACTURER OF FREIGHT AND PASSENGER CARS

PULLMAN-STANDARD

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The famous *General* became a prize of war during the Civil War when she was captured at Big Shanty, Ga. However, after a hair-raising 90-mile chase, she was recaptured by two intrepid railroad men with the assistance of Confederates. She remained in special service well into the 1890's.

Then...and now...serviced with Esso Railroad Products

Valuable years of experience in research and development, along with continual testing on the road, stand back of the outstanding performance of famous Esso Railroad Products.

Diesel Fuels
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AROX—pneumatic tool lube
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RAILROAD PRODUCTS

Rock Island

a part of the nation's transportation fabric

1852.....1956

Into the transportation fabric of the nation are woven the threads of the railroads. For 104 years the Rock Island has helped to give warp and woof to this fabric. Its rails moved slowly westward from Chicago... eventually its 8,000 miles of right-of-way became a part of the transportation fabric of 14 mid-continent states!

Today the Rock Island places at the disposal of the nation's shippers a great fleet of swift-moving power houses—the ROCKET FREIGHTS. Known for their dependability, they haul mountains of freight, are doing an outstanding job.

Passengerwise, Rock Island offers you the famous ROCKETS. They operate between Chicago and Des Moines... Omaha ... Denver-Colorado Springs; between the Twin Cities, Kansas City and Ft. Worth, Dallas and Houston; and between the Twin Cities and St. Louis. There is also the GOLDEN STATE between Chicago and Los Angeles; the JET ROCKET between Chicago and Peoria.

Any Rock Island representative will be glad to assist in solving your shipping or travel problems.

Rock Island Lines

The Road of Planned Progress

Progress through Teamwork

GEARING their own progress and future to the welfare of the railroads, an important group of supply companies organized the RAILWAY PROGRESS INSTITUTE one year ago to help the railroad industry in every way possible.

This new "voice and promotional arm of the railway supply industry" has already rolled up a truly impressive record of effective work... and its program is just beginning.

The RPI membership insignia... the Hallmark of Teamwork... has therefore become the symbol of wholehearted cooperation for mutual achievement and success... a symbol of promise for a prosperous future together.

Railway Progress Institute

The Voice and Promotional Arm of the Railway Supply Industry

38 South Dearborn Street, Chicago 3, Illinois

EXTENDED LIFE
SPRINGS ...
... COST NO MORE
THAN ORDINARY SPRINGS ...
RESEARCH TO PRODUCTION
RPI
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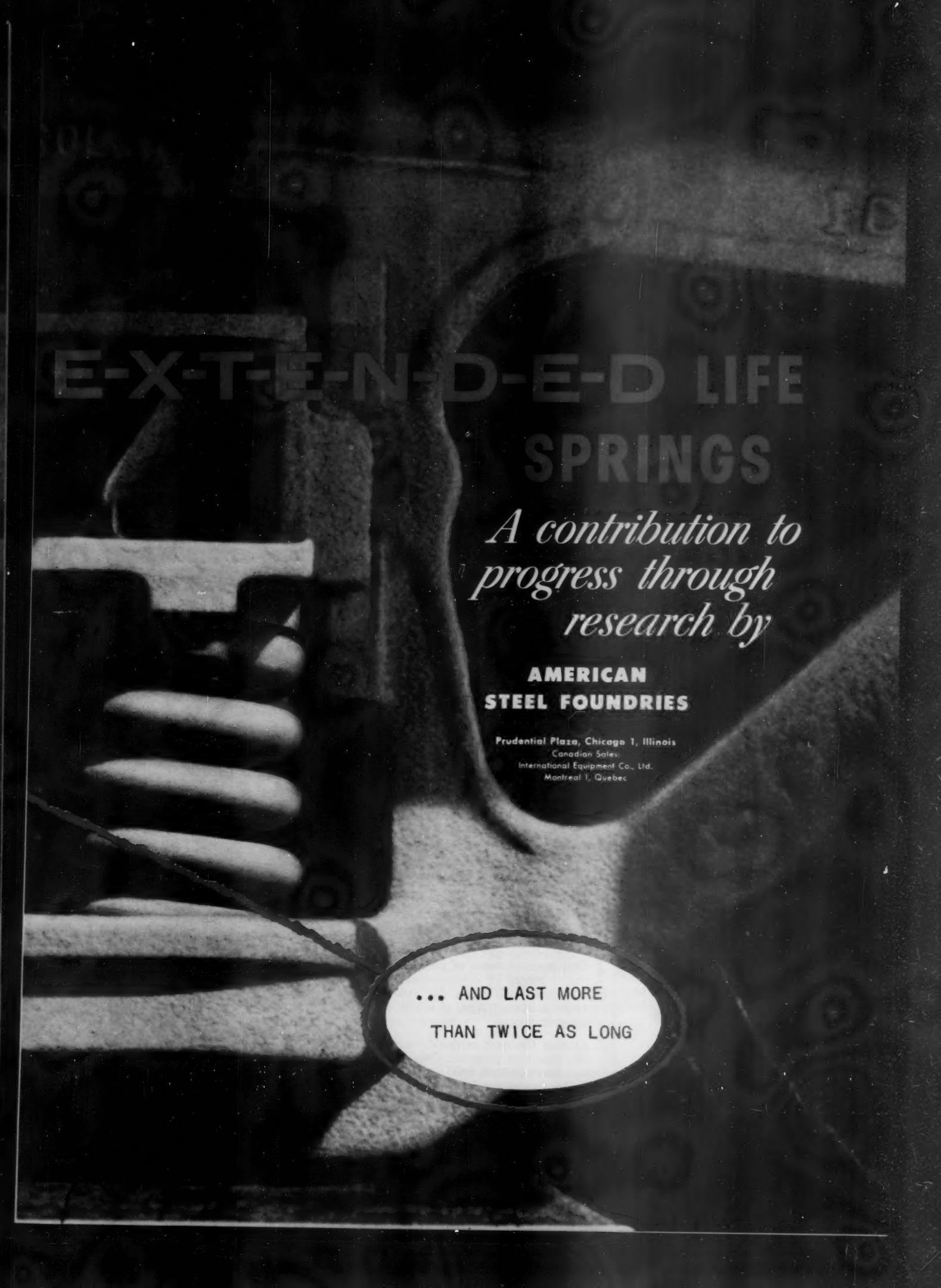
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SPRINGS
A contribution to progress through research by
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... AND LAST MORE
THAN TWICE AS LONG

Mile Post 100!

FASTEST
FREIGHT
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17 HOURS
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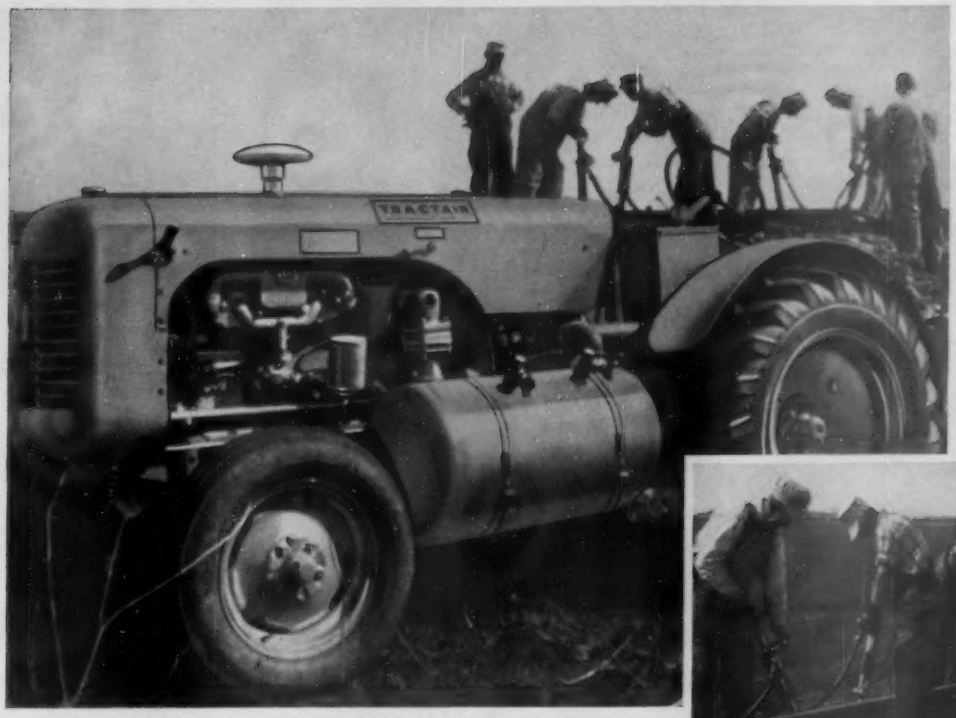
Kansas City
to
Dallas • Ft. Worth

One hundred years of progress . . . an enviable record of achievement! The Katy Railroad, itself but a few years younger than *Railway Age*, extends heartiest congratulations.

During the past century the Katy, too, has seen vast progress. Today Katy offers the finest in fast, safe, dependable freight and passenger service. Next time you travel or ship Southwest . . . remember, it's Katy!

M·K·T
MISSOURI-KANSAS-TEXAS
THE KATY RAILROAD
SERVING THE GREAT SOUTHWEST



Tractair is versatile — does all these jobs: Tamps ties. Breaks pavement. Drives earth augers and mail points for grouting. Light backfilling. Stock piles ballast, cinders, other materials. Handles off-season work for B&B, Signal, T&T, and Water Service Departments.

A group of Le Roi-Cleveland No. 10 Tie Tampers. This tool weighs only 36 lbs. Section hands find its high-speed, vibration-free action less tiring. They do their work faster and more uniformly.

Le Roi Equipment Aids Railroads' Pattern of Progress

Maintenance and track-construction equipment such as the Le Roi Tractair contributes to great advances made by American railroads over the past century.

Railroad progress in the last 100 years has given the nation fast, safe, comfortable travel from coast to coast. The future is even brighter. Today, modern maintenance and construction equipment such as the Le Roi Tractair, Le Roi portable air compressors, and Le Roi-Cleveland tie tampers, permits railroads to get work done fast and at lower cost.

Tractair, a 42-hp wheel tractor and a 125-cfm air compressor in one self-propelled unit, is a real working partner of railroads. For tie-tamping, track changes, and many other jobs, the Tractair provides money-saving work advantages. This versatile unit is on the job fast. It can climb soft ground, high rails, and steep banks under its own power.

Once on the job, Tractair keeps air tools working with power from its 125-cfm compressor. Jobs get done quickly with important time and cost savings.

Le Roi portable compressors also play a major role in railroad operations. These units are light and maneuverable, easy to handle on rough, crowded sites. Even inexperienced operators find them simple to operate and maintain. Compressor design simplification makes this possible, assures you of peak performance day after day.

Air tools such as Le Roi-Cleveland tie-tampers are doing their part, too, in the railroad pattern of progress. These tie-tampers weigh only 36 pounds. Workers handle them with ease and get more actual work done in a day.

Le Roi is proud to have had a working partnership with the railroads — a part in this great and exciting story of America's development.

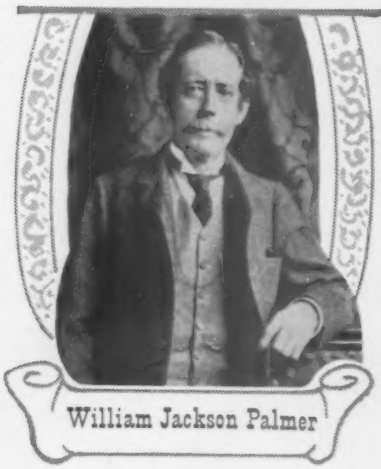
Le Roi Portable Compressors helping to construct service pit for diesel locomotive maintenance. Sizes range from 85 to 600 cfm, gasoline- or diesel-powered.

GEARED TO PROGRESS
RPI MEMBER

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty engines. Write us for information on any of these products.

T-54

100 Years Ago



William Jackson Palmer

1856 Rio Grande Was Not Yet A Gleam In Its Founder's Eye

100 years ago, then 20 years old, William Jackson Palmer was an avid student of railroads in the United States and in England. He was secretary to J. Edgar Thomson of the Pennsylvania Railroad, and listened attentively to lively discussions of a railroad crossing the continent from the Atlantic to the Pacific.

The Civil War sidetracked his railroad career. He became a brigadier general, acclaimed as the "best cavalry officer in the service." Immediately after terminating military service he headed west. Just 34 years of age in 1870, he founded the Rio Grande and became its first president.

Thus was conceived the Rio Grande, a railroad which has been

PIONEERING FOR 86 YEARS!

The Denver & Rio Grande was originally set up as a trunk line beginning at Denver and terminating at Mexico City. The projected route followed the Rio Grande del Norte, but development of Rocky Mountain mining regions turned it forever west and only the name, Rio Grande, remained of the railroad's initial plan. Thus from its very beginning the Rio Grande was dedicated to building of the western empire it chose to serve.

Initially, narrow gauge equipment gave fastest possible transportation within the region, but economic development of the nation demanded a heavy-duty direct central transcontinental route and Rio Grande's narrow gauge Royal Gorge Route between Denver and Ogden, Utah, by 1890,was converted to standard gauge main line.

While many still marveled at rail penetration of the Rockies, Rio Grande was proving the advantages of its route through the Continental Divide. The mountains acted as giant snow fences, giving year-around protection from the elements and earning for Rio Grande designation as "The Scenic Line of the World."

Rio Grande in 1934 supplemented its Royal Gorge Route via Pueblo gateway with its Moffat Tunnel Route between Denver and Ogden via the 6.2-mile-long Moffat Tunnel directly west of Denver.

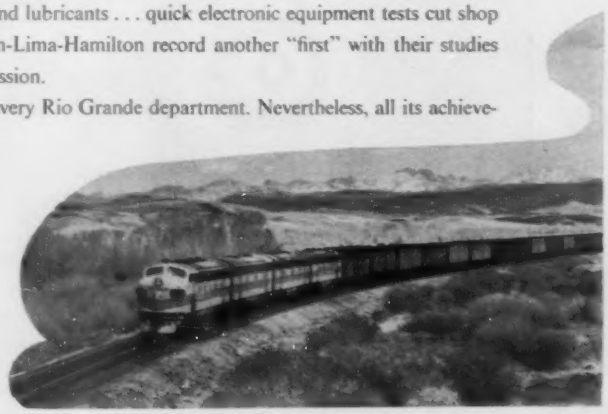
Pioneering never stops—year in and year out, Rio Grande has set the pace for progress . . . when increased traffic seemed to demand a double track system, Rio Grande introduced Centralized Traffic Control, giving its system 85% the efficiency of costly, long-term-construction double track . . . diesel-electric locomotives proved their superiority . . . first train-to-station radio communication was proved and adopted.

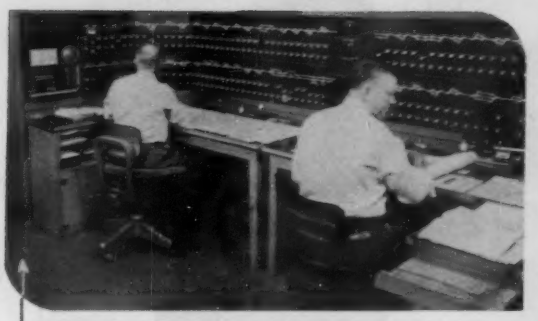
Rio Grande early cleared its steel highways of bulky work trains, revolutionizing railroad maintenance through use of off-track equipment . . . in its offices, Rio Grande speeded reporting and accounting with new automatic business machines.

Rio Grande's Research Laboratory is the focal point in railroad progress . . . its many contributions include discovery that an economical additive will permit use of lowest cost diesel fuels and lubricants . . . quick electronic equipment tests cut shop time to the minimum . . . for the atomic age, Rio Grande and Baldwin-Lima-Hamilton record another "first" with their studies on atomic locomotive power authorized by the Atomic Energy Commission.

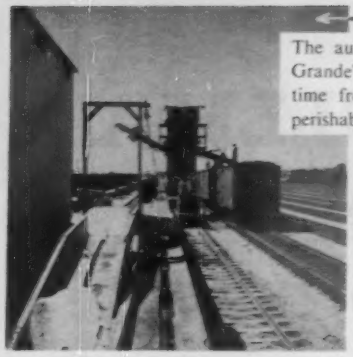
The pioneering spirit that conceived it is evident throughout every Rio Grande department. Nevertheless, all its achievements, successes and accomplishments are but humble testimony to Rio Grande's one sole objective:

To give *you*, shipper and passenger, the very finest transportation service possible!



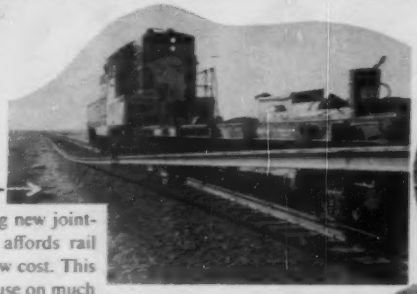


Centralized Traffic Control gives single track 85% efficiency of double track. This board at Grand Junction regulates 284 miles of track.



The automatic icing operation at Rio Grande's North Yard in Denver cuts time from schedules on shipments of perishables.

A new radio-telephone communication system developed by a Rio Grande electronics expert keeps foremen advised-to-the-minute of all traffic on their sections . . . permits longer work periods without delay to main line trains.



Rio Grande's method of distributing new jointless welded steel rail to track site affords rail replacement without delay and at low cost. This new, heavier and smoother rail is in use on much of Rio Grande's main line.

The electron microscope photographs specimens "blown up" 45,000 times . . . first applied to railroad research by the Rio Grande, it makes possible important improvements and economies in diesel fuel oil.

Rio Grande's new modern classification yard at Grand Junction permits most efficient freight movement in shortest period . . . cuts hours from terminal time at Rio Grande's Denver, Pueblo, Salt Lake City and Ogden gateways.

The Vista-Dome California Zephyr (CB&Q-D&RGW-WP) is designed and scheduled for daylight sightseeing thru the Colorado Rockies. Vista-Dome cars were inspired by the magnificent scenery along Rio Grande's main line. In fact, the whole Dome family was conceived here.

MAIN LINE Rio Grande THRU THE ROCKIES

TRAFFIC OFFICES IN 34 MAJOR CITIES

Rio Grande "*Pioneering for Progress*" is dedicated to giving you the finest transportation service possible. For help with all your transportation, call the Rio Grande agent near you.

DENVER & RIO GRANDE WESTERN RAILROAD

The Direct Central Transcontinental Route

R. K. BRADFORD, Vice President-Traffic • Rio Grande Building, Denver 2, Colorado

Why PULLMAN is everybody's way to travel!

Whoever you are... wherever you live... wherever you are going... anyone who travels can afford to travel by Pullman!

What Priceless Privacy! Step into your private room. A Pullman is a fine hotel on wheels—for *every* traveler to enjoy. There's nothing else like it—anywhere. Try it on *your* next trip. Remember this—Pullman privacy costs less than you think!

How Incomparably Safe! No other form of travel, on land or above it, is so completely restful *and so safe*. Take the whole family. *Relax* every mile of the way, in confidence and peace of mind. Even the folks who stay at *home* can rest easier!

Where Else Such Comfort! How else can you travel so *fast*, so *sure*, so *comfortably?* Every service, every convenience, at your fingertips. Deep, soft, daytime seating. Wonderfully white, king-size beds! Why deny yourself these famous Pullman comforts?

When Minutes Count! Pullman is a time-saver, whether you travel for business or pleasure. No highway traffic delays, no disrupted schedules! You avoid driving tensions, weather worries. Call your local Ticket Agent. Travel by Pullman and be *sure!*

Only Pullman can offer you all these travel advantages: The convenience of heart-of-town depots • Dependable schedules of departure and arrival • No parking problems or stormy-weather worries • Individually-controlled heat, air-conditioning • Superb dining cars; no time-wasting stops for meals • Travel while you sleep—arrive rested, refreshed!

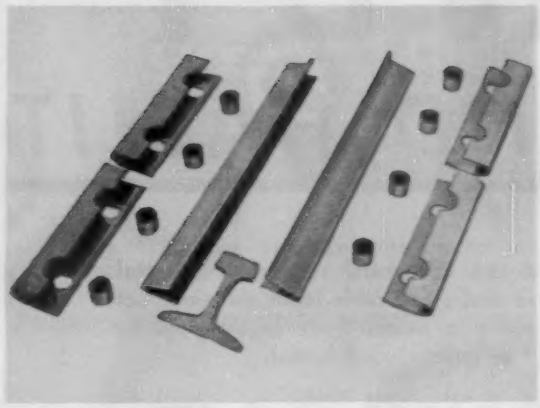
YOU'RE SAFE AND SURE WHEN YOU TRAVEL BY

Pullman

Your local Ticket Agent will help you these five ways:

1. *Provide information on routes, schedules, Pullman accommodations and fares.* 2. *Make your Pullman reservations, going and returning.* 3. *Furnish your rail and Pullman tickets.* 4. *Assist you in planning stop-overs and side trips.* 5. *He will even have a "rent-a-car" reserved for you at your destination, if you wish.*

Taylor Armored Block Joint Insulation



- made to AAR specifications
- priced right
- delivered promptly

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Laminated Plastics
Vulcanized Fibre

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Branch Offices: *Atlanta; Boston; Chicago; Cleveland; Dayton; Detroit; Indianapolis; Los Angeles; Milwaukee; New York; Philadelphia; Rochester; San Francisco; St. Louis; Rockville, Conn.*

What Is It You Need For

E-X-P-A-N-S-I-O-N?

Is It LAND?

THE RUTLAND HAS IT

In Vermont and northern New York, Rutland territory has much to offer light or heavy industry.

At our Ogdensburg terminal for instance, there is available up to 100 acres of industrial land fronting on the St. Lawrence River. Sidings and utilities are already in. This location will tie in with the St. Lawrence Seaway and will also benefit from the St. Lawrence Power Project which will provide low-cost electric power.

Vermont and northern New York have the ingredients for industrial success with land rich in natural resources, plentiful water and a favorable labor situation. Let us tell you more. Your inquiry will be held as strictly confidential.

RUTLAND

RAILWAY

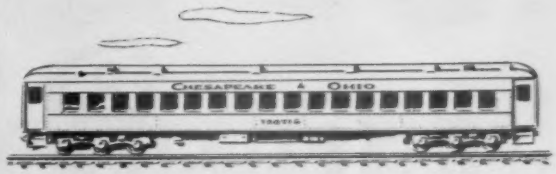
Rutland, Vermont

"Route it Rutland — and Relax"

". . . RUTLAND has available up to 100 acres of industrial land fronting on the St. Lawrence River at Ogdensburg, N. Y."

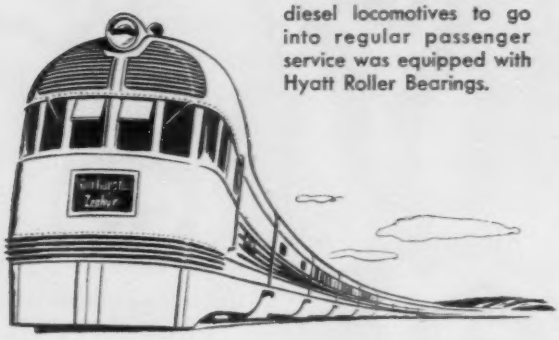
Another milestone in sight!

1894: The first Hyatt Roller Bearings for railroads were introduced.

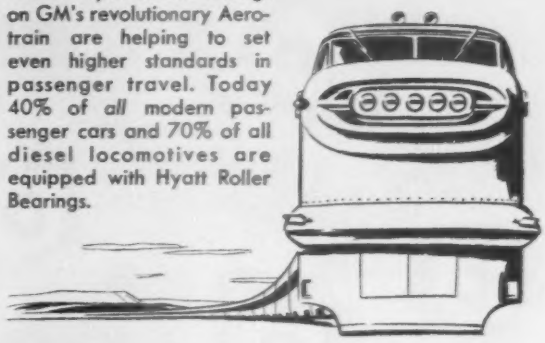


1923: Hyatt Roller Bearings ushered in a new era of speed and comfort in passenger travel.

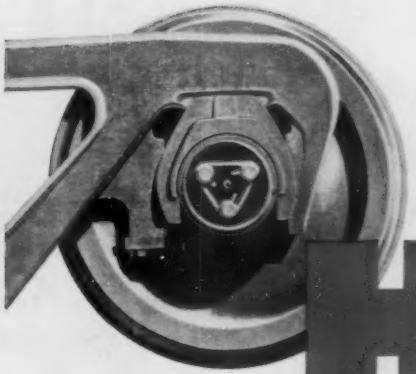
1934: One of the first diesel locomotives to go into regular passenger service was equipped with Hyatt Roller Bearings.



1956: Hyatt Roller Bearings on GM's revolutionary Aerotrain are helping to set even higher standards in passenger travel. Today 40% of *all* modern passenger cars and 70% of all diesel locomotives are equipped with Hyatt Roller Bearings.



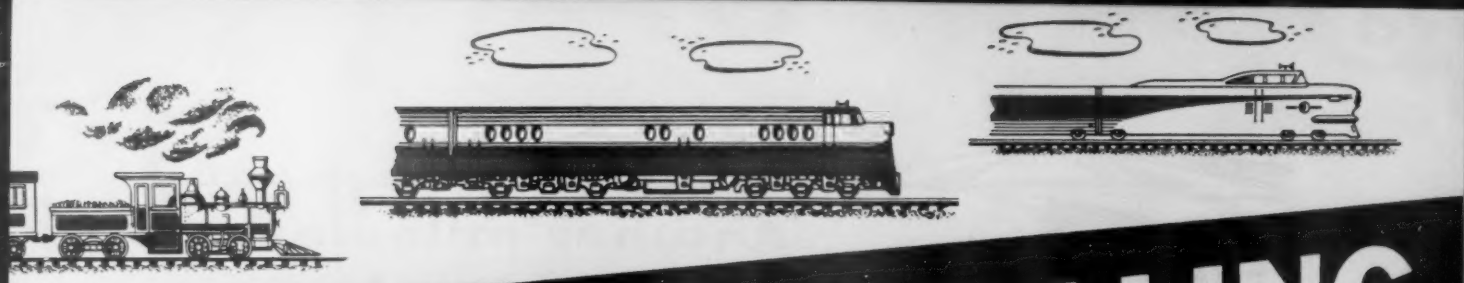
TOMORROW'S milestone—roller bearings on all freight cars—is now in sight! The new Hyatt Hy-Roll Bearing, already adopted by twenty-six railroads, makes the *big change to roller bearing freight practical at last!* This one bearing fits both old and new cars, requires no fitting adjustments. There are only four parts on the axle, all interchangeable. Hyatt's straight cylindrical rollers have greater load-carrying capacity, longer life. A three-year, sealed-in supply of lubricant reduces inspection and maintenance to a bare minimum. And of course, Hyatt Hy-Rolls eliminate costly hotbox delays. Result: lower operating costs, improved service and greater earnings for American railroads. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.



HYATT

HY-ROLL BEARINGS FOR NON-STOP FREIGHT

Another GM Contribution to Railroad Prosperity



GRS SIGNALING

for Efficient Railroad Operation

For well over a half century, the General Railway Signal Company and its predecessor companies have been in the forefront of signal progress. Working in close cooperation with the railroad industry, GRS has made many notable contributions to railroad signaling. Today these systems are in use all over the world.

But at GRS we are aware how quickly yesterday's progress can become tomorrow's stagnation. To avoid this, we are constantly at work, re-examining the old to see how it can be improved, investigating the completely new to see how it can be adapted to provide better railroad signaling. Our Transportation Research engineers are studying the whole problem of main-line traffic flow and its efficient control. Our Yard and Terminal engineers are directing their efforts to the complex problems of gravity yard design and safe, efficient car classification.

In our laboratories, we have expanded our program of research and development. In particular, the signal applications of electronics (including transistors and other solid-state devices), new communication methods, and computer techniques are being actively investigated.

So, at GRS we continue in the spirit which has already achieved so much. As your partner in railroad progress, we confidently look forward to future developments in the art of signaling as important to efficient railroad operation as any in the past.

GENERAL RAILWAY SIGNAL CO

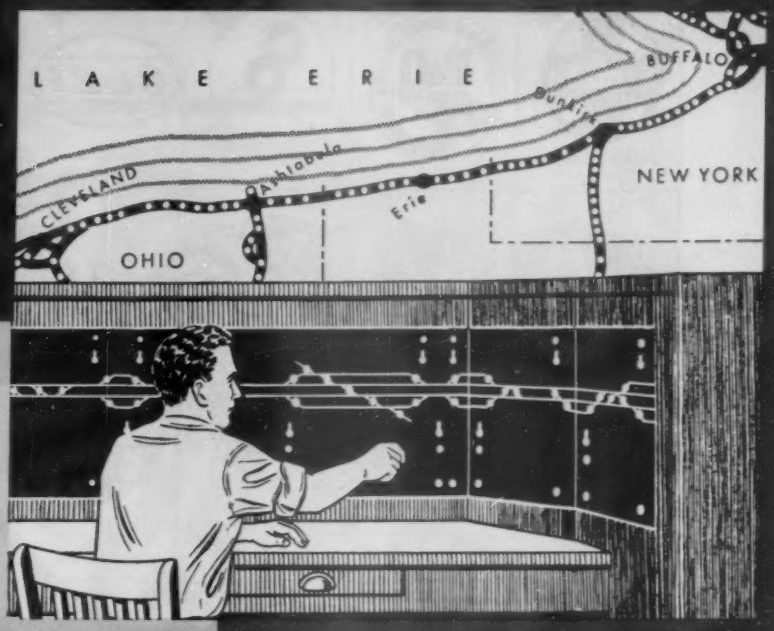
ROCHESTER 2, NEW YORK

NEW YORK 17 • CHICAGO 1 • ST. LOUIS 1

GRS CAR CLASSIFICATION SYSTEMS

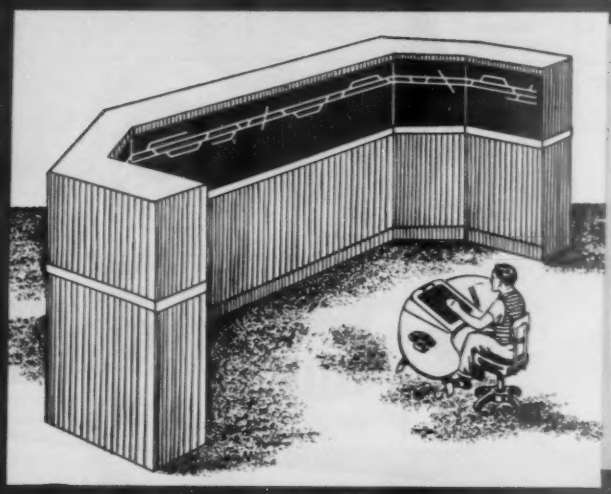
GRS electric car retarders, automatic switching, and automatic radar retarder control permit high humping rates, least delay between trains over the hump. The result: more cars switched per man-hour and locomotive-hour. You cut yard expense, reduce per diem charges, and provide faster service to customers.

SYSTEMS



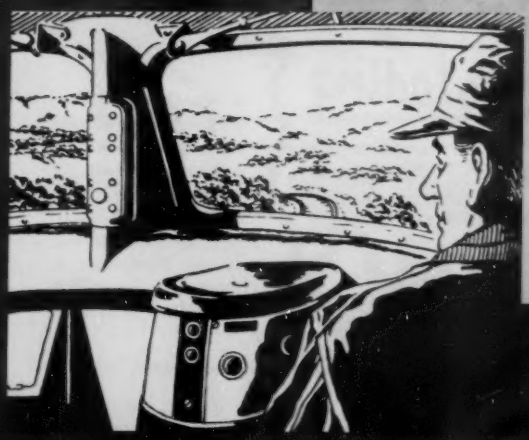
GRS SYNCROSCAN cTc

Electron fast and relay sure, Syncroscan cTc sweeps aside limitations of older systems. Syncroscan's speed and capacity make it feasible to control traffic over hundreds of miles of main line, including major interlockings, from a single office. Now you can concentrate control to an extent never before practical.



GRS TRAFFIC MASTER CONTROL CENTER

The Traffic Master Control Center concentrates push-button controls on a small console at the operator's fingertips. One man can now handle more trains and more locations than ever before. The Traffic Master Control Center is a natural adjunct to your programs for interlocking consolidation and extended cTc.



GRS CAB SIGNALS AND CONTINUOUS TRAIN CONTROL

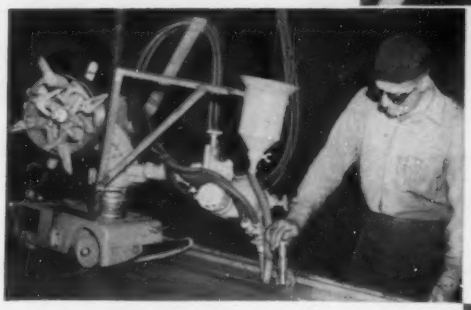
GRS cab signals display the signal aspect directly in the locomotive cab. Continuous train control enforces corresponding speed limits. For today, this provides maximum integration of signal system and train operation. For the future, it offers the possibility of completely automatic trains operated by remote control.

• Whether you're a shipper or a railroad man, you'll benefit by writing, now, for all the details on Evans DF equipment. Address: Evans Products Company, Dept. E-9, Plymouth, Michigan.

***EVANS PRODUCTS COMPANY** also produces:* **truck and bus heaters; bicycles and velocipedes; Evaneer fir plywood; and Evanite battery separators**

Serving Railroads at Every Turn

Linde
TRADE-MARK



Above: Continuous Rail Laying

Left: Rolling Stock Fabrication and Repair

Below: Structure Welding and Cutting

In shops, on bridges, and along the right of way—LINDE's modern metalworking processes are helping the nation's railroads maintain efficiency, and modernize for the future . . . at minimum cost and time.

Backed by over 40 years of accumulated know-how, LINDE's unmatched engineering facilities are being used to help customers solve welding, cutting, and heat-treating problems of all kinds. Coast to coast, LINDE engineers and service representatives are helping the railroad industry constantly to improve road and shop fabricating operations.

For a complete line of modern electric welding, oxy-acetylene welding, oxygen-cutting, flame-hardening, and continuous rail welding apparatus—*look to* LINDE.

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under this familiar symbol . . .

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

"Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

Courtesy of Santa Fe

Courtesy of Rio Grande

BLAZING NEW

The past 100 years have encompassed four-fifths of the entire era of rail transportation in this country. The monumental growth of the United States since 1856 has been pioneered to a very large extent by the spreading network of rail communications.

The position of the railway industry today is the key to the future. New trails are being blazed in... automation... rail design... electronics... radar... dieselization... atom power, etc. These new developments are possible because the railroad industry is ever alert to new processes, new methods and improved means of achieving highest quality performance. These technological advances will enable the railroads to meet the future demands for increased rail transportation.

Railway Age has made an important contribution to the industry in the past and is destined to play a vital role in the future. CF&I is proud of its close association with the industry and the part it is playing in the progressive program.

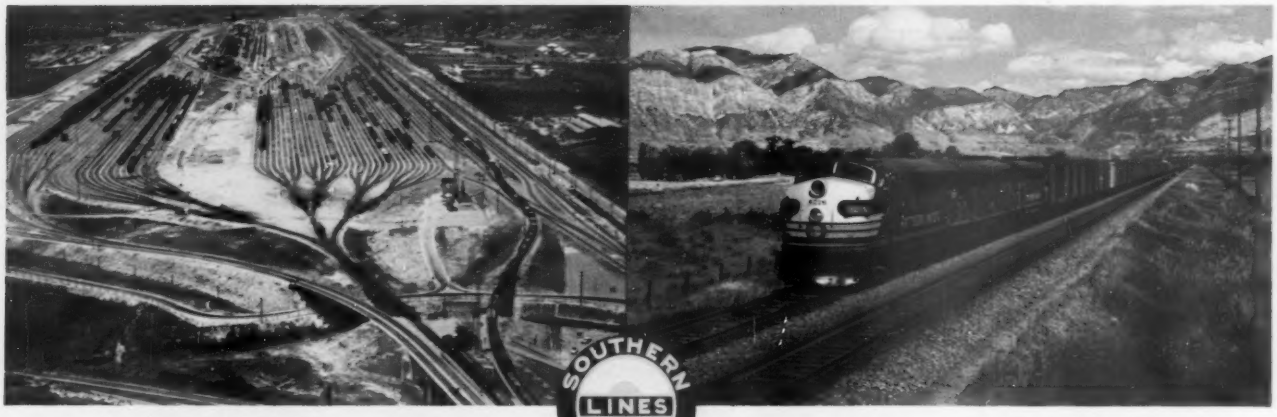
THE COLORADO FUEL AND IRON CORPORATION
DENVER, COLORADO

CF&I

Courtesy of Western Pacific

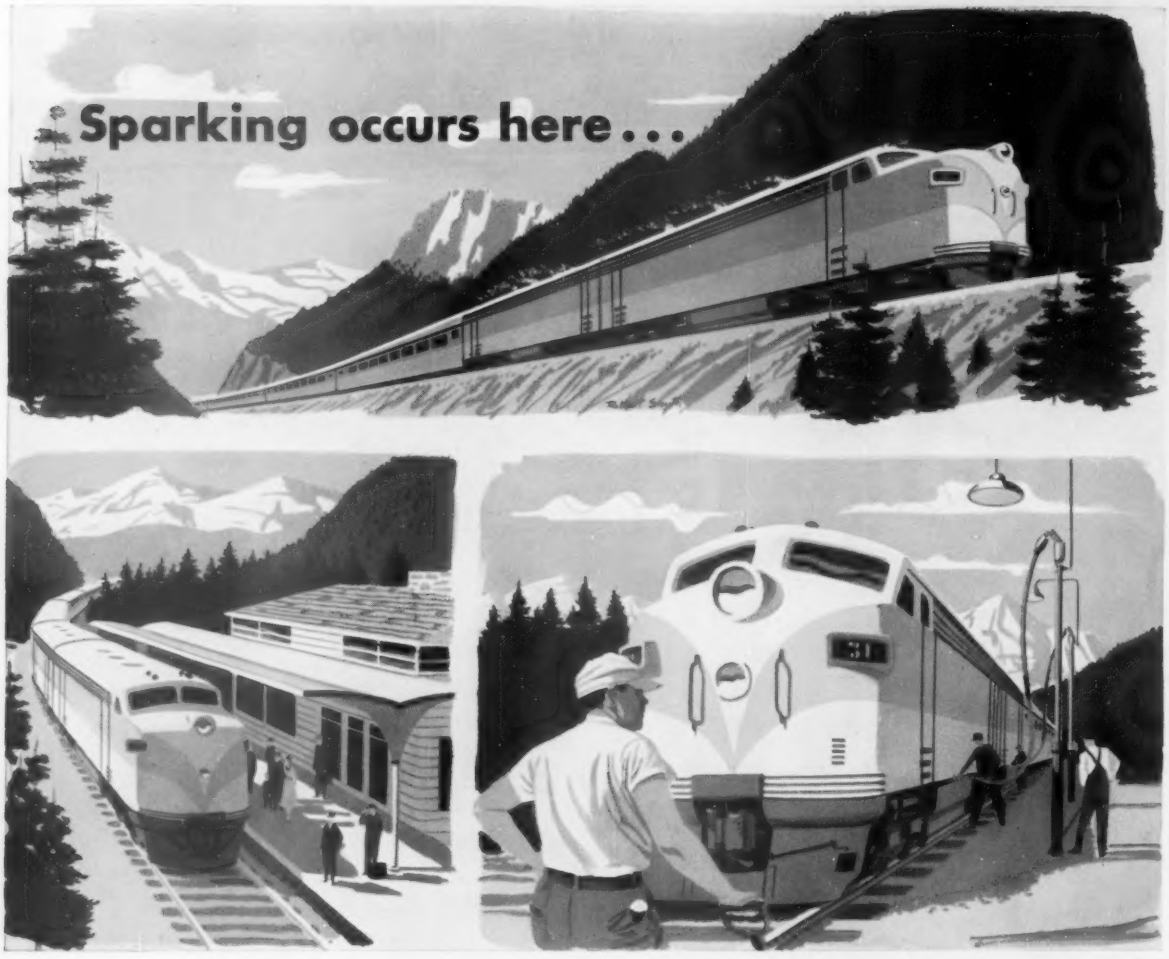
TRAILS

Courtesy of Cotton Belt



Courtesy of Texas and New Orleans

Courtesy of Southern Pacific



though it started here...could have been prevented HERE

If you find that increased sparking hazard accompanies the use of economy fuels, you will be interested in Du Pont's method of preventing it.

How do sparks form?

Carbon deposits build up when engines idle, while standing or coasting. Then when they are put under load, the deposits are ejected . . . and represent a fire hazard.

Tests show that sparking tends to occur when metallic additives are used. This is because they tend to cause larger carbon deposits with greater tendencies to glow.

How to minimize sparking

By specifying fuel treated with an ashless, non-metallic additive, you can greatly reduce this fire hazard. But that's only one of the reasons Du Pont Fuel Oil Additive No. 2 (FOA-2) is recommended for railroad diesel fuels.

Eases filter and injector troubles

FOA-2 also helps you cut the increased maintenance costs sometimes encountered with economy grade fuels. Because FOA-2 is an excellent stabilizer and dispersant, it decreases the rate of insoluble residue formation and so prevents filter-plugging and injector-sticking. Only minute concentrations are required to provide the necessary stability. FOA-2 also has rust-preventive properties.

A Du Pont Petroleum Chemicals Division technical representative will be glad to discuss with you in detail the use of Du Pont FOA-2.

DU PONT
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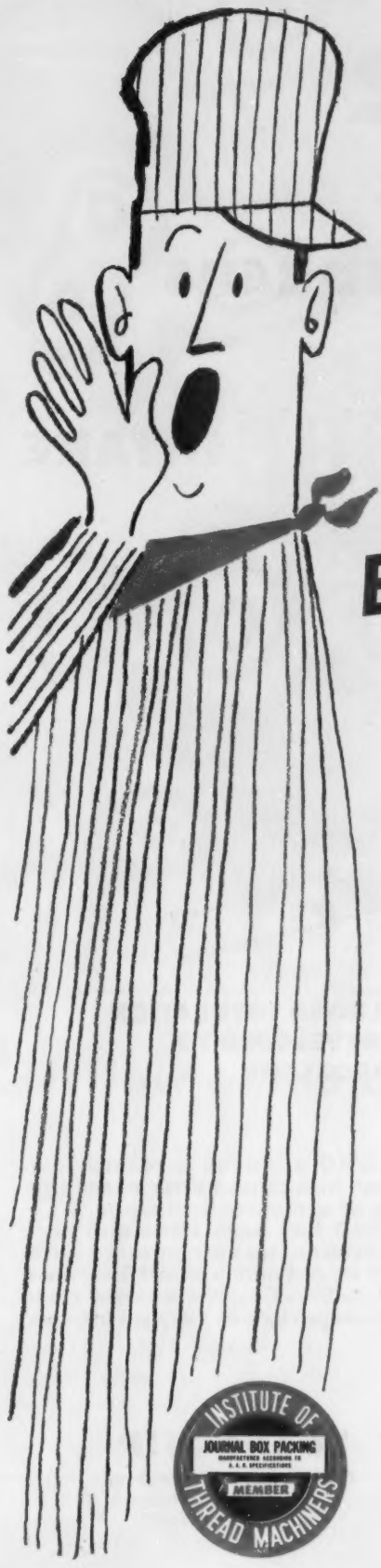
Better Things for Better Living
. . . *through Chemistry*

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & CO. (INC.) • Petroleum Chemicals Division • Wilmington 98, Delaware



Proved Service and Economy versus Expensive Substitutes

Simple Arithmetic

2,000,000	Freight cars packed with unproved substitutes such as pads, etc. @ an average price of $50.00 per car set.	$100,000,000.
2,000,000	Freight cars packed with approved A. A. R. Journal Box Packing @ approximately $4.90 per car set.	$ 9,800,000.
	Difference in savings to Railroads.	$ 90,200,000.

This is real economy.

There is no economical replacement for A.A.R. Approved Journal Box Packing.

Think this over and avoid being stampeded into exorbitant expense for unproved gadgets.

INSTITUTE OF THREAD MACHINERS, INC.

141 East 44th Street, New York 17, New York

Atlas Processing Corp., New York, N. Y.
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Miller Waste Mills, Inc., Winona, Minn.
National Waste Company, New York, N. Y.
O'Neill Brothers, Inc., Philadelphia, Pa.
The Pittsburgh Waste Co., Inc., Swissvale, Pa.
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Royal Manufacturing Company, Perth Amboy, N.J.
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Protect

YOUR REFRIGERATED CARS FROM BOTH

HEAT and MOISTURE INTAKE

WITH

ISOFLEX-k20

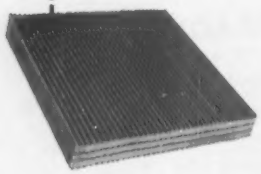
THE ONLY RAILROAD INSULATION SPECIFICALLY DEVELOPED TO SOLVE THESE PROBLEMS

Two things are equally important when insulating a refrigerator car

1. **Moisture protection***
2. **Heat intake**

*Moisture is the number one enemy of low temperature structures especially in the railroad transportation field.

Isoflex-k20 ensures a record low basic heat intake and eliminates the problem of moisture influence. Isoflex-k20 has been tried and proven in mechanical refrigerated cars operated by---Pacific Fruit Express Co,. A.T. & S.F. Co., Merchants Despatch Transportation Co. and others.



ISOFLEX SALES CO.
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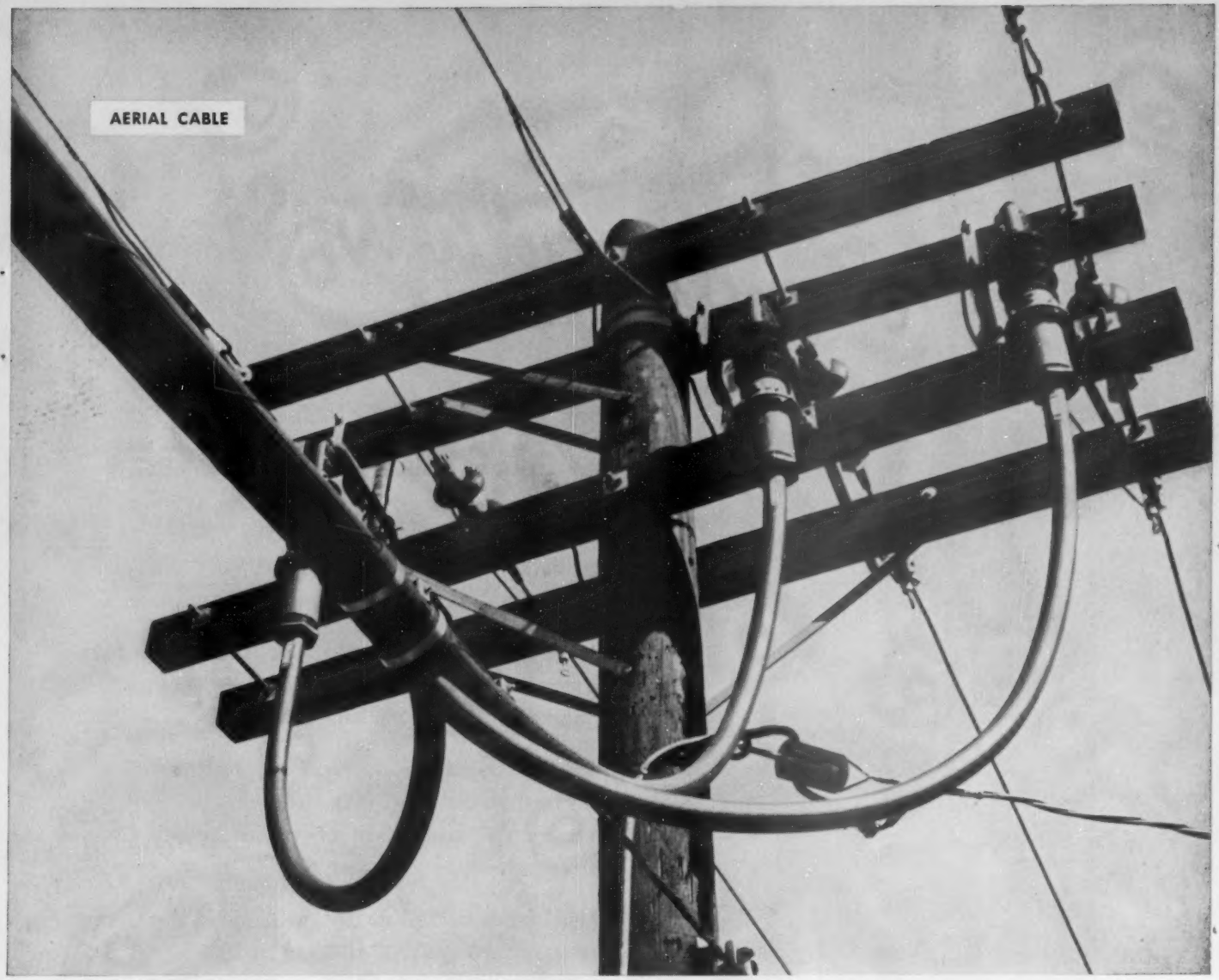
Redwood City, Calif.
EMerson 8-2935

TRANSQUIP
3208 North Major Ave.
Chicago 34, Illinois
SPring 7-5616



High-ozone resistance of Anaconda Type AB-insulated cable pays off here where ozone-cutting is often a problem when ordinary insulation is used.

New aerial cable gives ozone the air

New Anaconda Type AB-insulated cable has *highest* resistance to ozone.

Ozone-cutting – No. 1 enemy of high-voltage insulation – can be arrested.

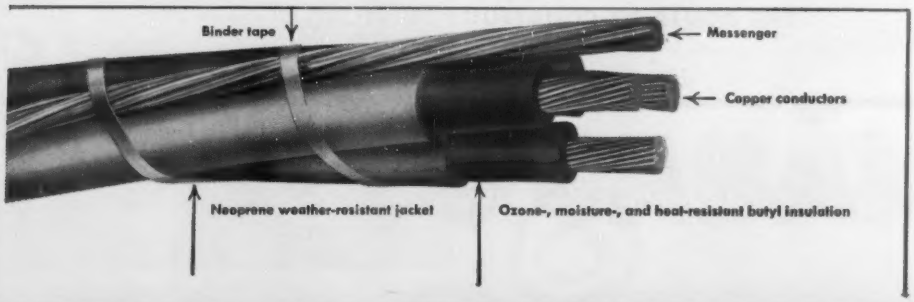
ANACONDA Type AB butyl insulation on aerial and other high-voltage cable ends this problem.

Type AB is *inherently* resistant to ozone. Moreover, this high resistance to ozone has enabled Anaconda engineers to concentrate on other properties – to develop Type AB's other electrical and physical properties to the very peak of performance.

Proof is in a series of tests – made over a period of years by Anaconda engineers. These tests – covering ozone, temperature, moisture absorption, dielectric strength, ionization level, aging, and other properties – show clearly the superiority of ANACONDA Type AB butyl insulation.

Put your cable problems up to the Man from Anaconda. Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

55336



ANACONDA®

AERIAL CABLE

It's time for

Congratulations!

To RAILWAY AGE

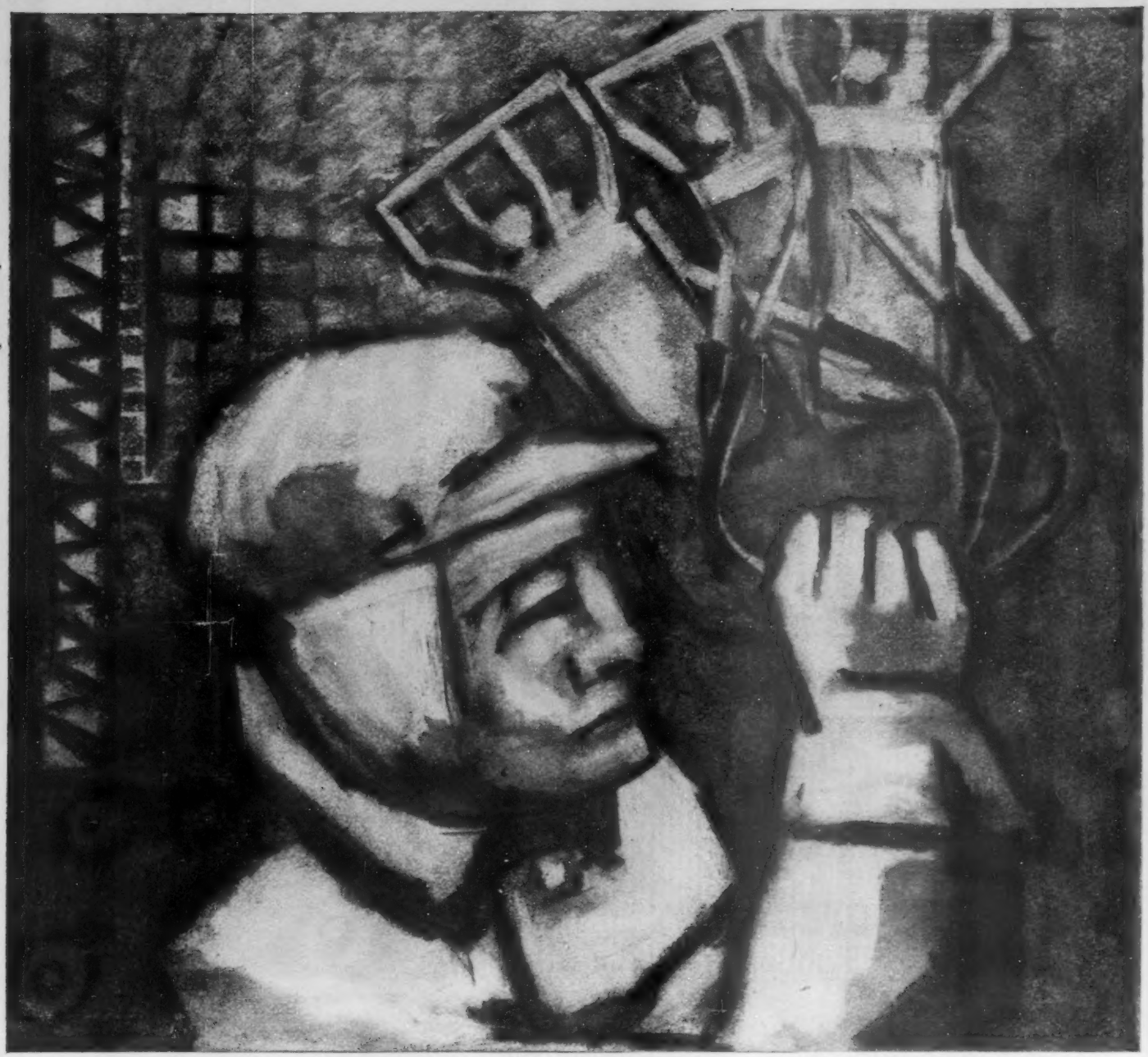
as that fine publication celebrates its
One Hundredth Anniversary.

While longevity is a compelling yardstick of success, it by no means tells the full story of accomplishment that has marked the growth and service of RAILWAY AGE.

Its record of conspicuous achievement is matched only by the boundless contributions it has made to the progress and best interests of the nation's railroad industry.

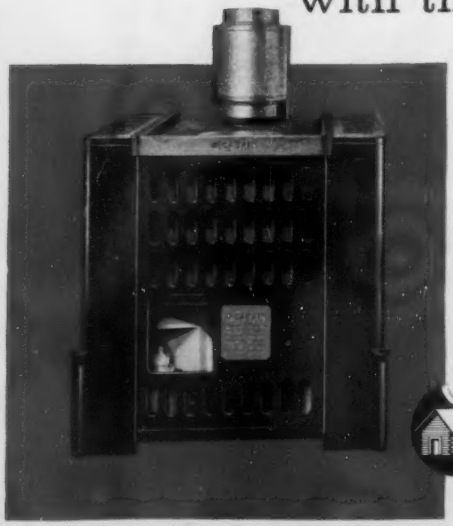
So, in this Centennial Year of 1956, we happily express appreciation to RAILWAY AGE and its capable staff for all that they have done in behalf of the industry . . . with our warmest good wishes for untold future years of still greater success!

THE ROUTE OF COURTEOUS SERVICE



"The Brakeman" • Reproduction suitable for framing upon request.

he'll be **warm and dry** in a matter of minutes with the new Vapor Cabàn Heater



The *modern* caboose heater . . . perfect for buildings of all types, too. Uses readily available diesel oil. Provides 55,000 BTU's of convective *and* radiant heat. *Convective* heat for healthy general warmth throughout the car; *radiant* heat to warm crewmen and dry clothing *quickly*. Table top stove provides facilities for cooking a hot meal. Tested in one full year of caboose service—rugged construction with solid floor-mounting will withstand the most brutal shock or vibration. Requires no attention from the crew—metering valve affords safe, accurate control.

Vapor Heating Corporation, 80 East Jackson Boulevard, Chicago 4, Illinois. Offices in principal cities.

CABÀN

Write for bulletin No. 441 for full information

ILLINOIS CENTRAL

Spiking down a dream

Monument honoring Roswell B. Mason, first Chief Engineer of the Illinois Central, dedicated September 17, 1956, at Mason, Illinois. The charter lines were completed at this point in 1856.

Chief Engineer Roswell B. Mason did it when he completed the charter lines of the Illinois Central Railroad in 1856. That was a great dream brought to reality—the longest railroad in the world, built to serve the yet-to-be-cultivated prairies of Illinois. The founders of *Railway Age* started building on another dream that same year when they established the magazine destined to chronicle the fortunes of U. S. railroading and to become an authoritative voice of a great industry.

In this 100th anniversary month of both events, it is right to pause and consider that both came to pass because of the courage, the diligence and loyalty of thousands of devoted employes. Through their untiring efforts, wonderful dreams of accomplishment took form and substance . . . it was they who drove home the spikes of reality.

ILLINOIS CENTRAL

Main Line of Mid-America

The MacLean-Fogg Lock Nut Company joins the entire railroading fraternity in saluting *Railway Age* for a century of contribution to the industry—and for its continuing dedication to the service of railway transportation in the next 100 years!

THE

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UNI-TORQUE

LOCK NUT

has something

more

than the standard holding features of ordinary lock nuts.

THE

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has a higher consistency of torque than ever before thought possible!

New design and precision manufacture make the M-F Uni-Torque a lock nut you can depend on . . . individually and by the keg!

Because of its low cost for high efficiency, the M-F Uni-Torque is the ideal lock nut for air brake equipment, angle-cock holders and other appliances subject to high vibration.

M-F LOCK NUT
No. 1
Used with a standard nut. Spins on.

M-F LOCK NUT
No. 2
Spins on, locks itself and holds.

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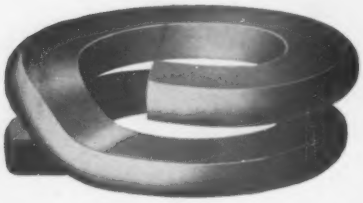
IMPROVED HIPOWER

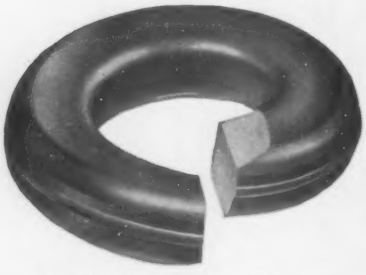
SUPER HIPOWER

DOUBLE HIPOWER



THACKERAY

SUPER COLLAR GROOVED



NATIONAL COLLAR GROOVED

6 MAINTENANCE COST REDUCERS

Here are six outstanding types selected from our complete line of railway spring washers. Any one will reduce maintenance cost somewhere on your road.

National's spring washers are used extensively—used by many many roads—along thousands and thousands of miles of track—on frogs and crossings throughout the world.

They have been tested, tried and found more than adequate.

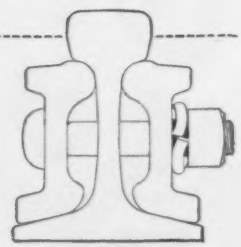
If you use one or only a few of these great railway spring washers let our engineers discuss with you the other types that could further reduce your maintenance costs.

IMPROVED HIPOWERS

IMPROVE TRACK

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N.J., U.S.A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS



Helping the railroads to better engineering equipment and materials since 1888

Specialized Services **for the inspection and testing of railroad purchases of materials and equipment**

"Hunt" Standard Inspection of Rails and Track Fastenings

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Inspection and Tests of Structural Steel, Reinforcing Steel, and Cement

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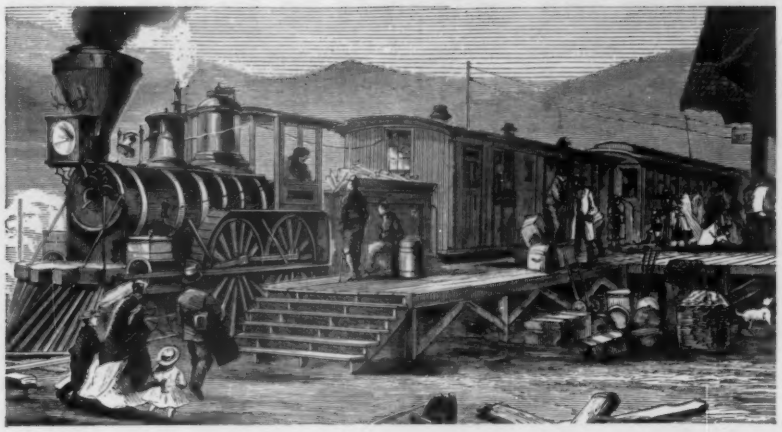


Yesterday's "Iron Horse" wouldn't satisfy today's management

THE WOOD BURNING LOCOMOTIVE of the last century has no place where speed, efficiency and economy are demanded. The same is true for outdated materials handling methods.

Today, many businessmen know that as much as one-third of their total operating costs can be traced to handling expenses... moving materials from one place to another.

That explains management's emphasis on choosing the mechanized handling equipment that is most efficient in saving time and money.

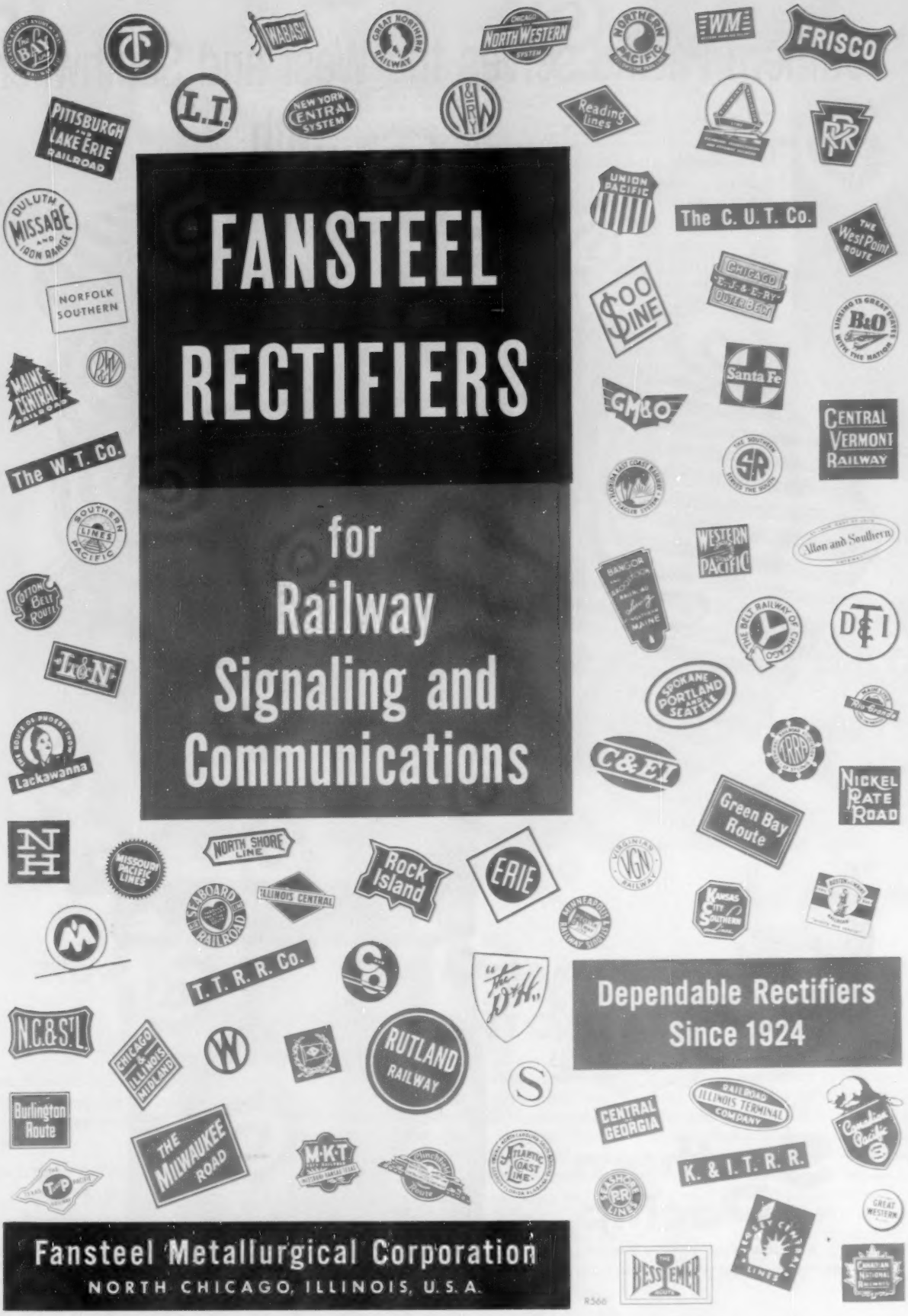
And it explains the widespread use of YALE Industrial Trucks and Hoists. For YALE offers to any business *the longest record of experience in the manufacture and scientific application of materials handling equipment*—a comprehensive line of Gas, Electric, Diesel and LP-Gas Trucks as well as Hand and Electric Hoists.

For information write to The Yale & Towne Manufacturing Co., Philadelphia 15, Pa., Dept. 489.

MECHANIZE HANDLING
MINIMIZE COSTS WITH...

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U.S. PAT. OFF.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Southern Pacific serves the West and Southwest with

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and 100 years of experience

Southern Pacific

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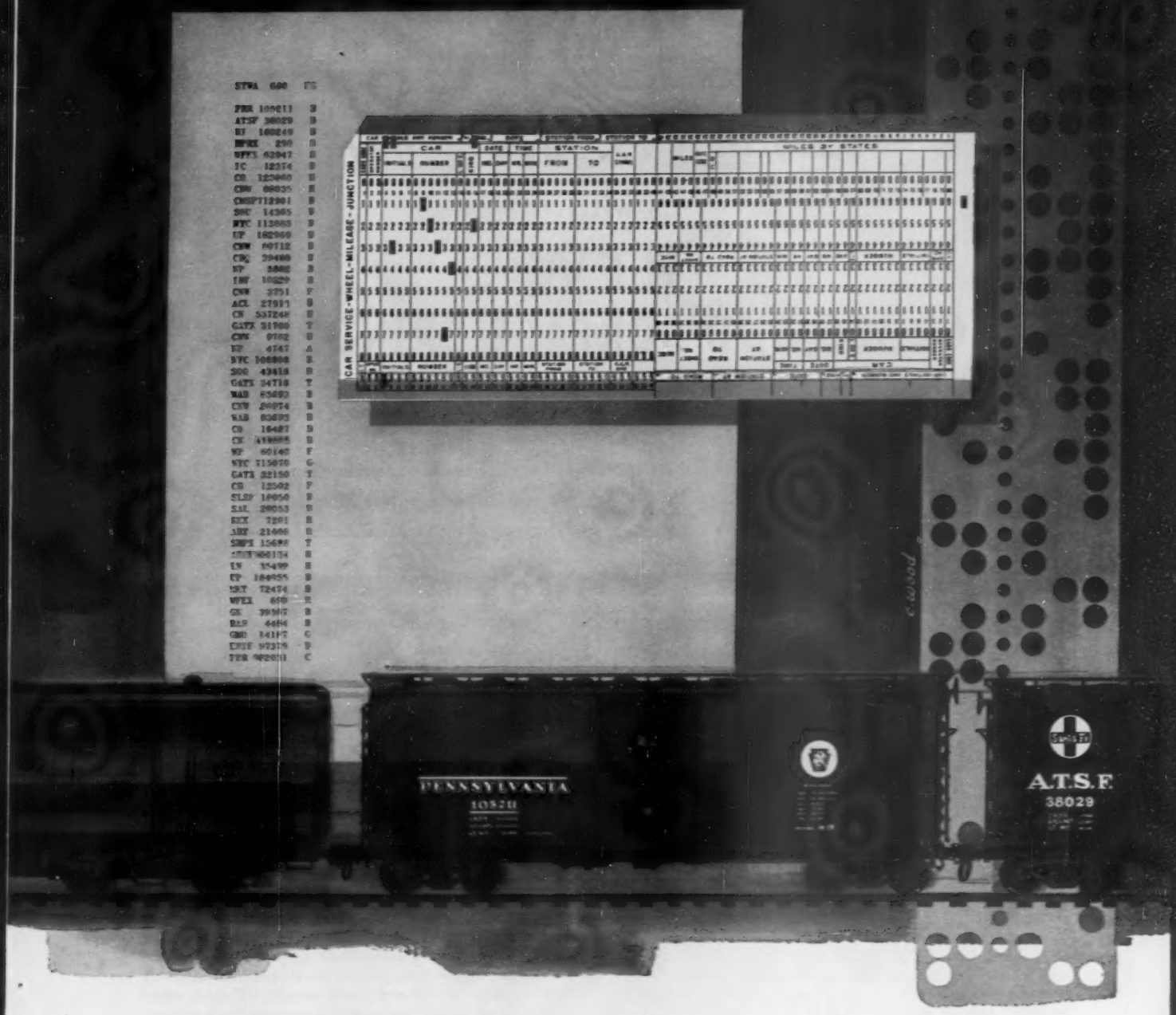
THE WEST'S LARGEST TRANSPORTATION SYSTEM



Now automatic, accurate car checking...

ELECTRONICALLY

New from Stewart-Warner Electronics—the Ident-A-System for instant reading, recording and transmitting complete car information.

Electronic Advantages of Ident-A-System

Instantly Reads...ownership, serial number, type of car, etc., of every car in train passing the all-weather trackside reading unit—at speeds up to 60 m.p.h. This reliable electronic reading never skips a car, transposes numbers, misses part of the information or makes other mistakes possible due to human error.

Accurately Records...train consist information on punched cards, punched tape, and teletype—in train order. Wheel reports, switch lists, interchange reports, traffic statistics and billings—all operating, accounting and traffic operations are improved by this accuracy and speed. Here is convenience never before available.

Automatically Transmits...this data from yard to yard, to general offices, car accountant, shipper service—wherever you need fast access to complete car information. Ident-A-System can also generate signals that automatically control classification yard operations.

Speed . . . Accuracy . . . Reliability—as combined in the new Stewart-Warner Electronic Ident-A-System—offer you the most valuable and versatile operating tool in modern railroading. We'll gladly show you how its advantages can be applied to the car checking problems on your property. Write Stewart-Warner Electronics, Dept. 31, 1300 N. Kostner Ave., Chicago 51, Ill., or Current Controls Corporation, 542 N. Dearborn St., Chicago 10, Ill.

STEWART SW WARNER ELECTRONICS

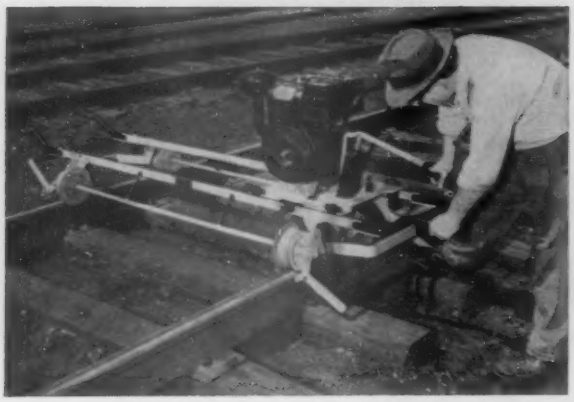
a Division of Stewart-Warner Corporation

save time . . . save money

with

RTW
CROSS AND SURFACE GRINDERS

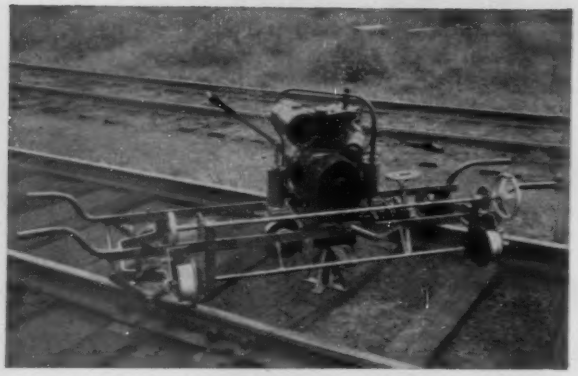
You'd have to make a long list to include all the famous railroads which depend on RTW Grinders to keep rails in perfect condition! The nation's foremost lines have found that where RTW maintenance equipment leads the way, economies naturally follow. Here are just two of the RTW machines that save time and money on America's most modern railroads.



PORTABLE CROSS GRINDER! MODEL P-11-S—This lightweight and versatile grinder was developed especially for the easy removal of overflow metal at rail ends, and cross grinding behind welding crews.

All grinding equipment and the 4 hp air-cooled gasoline engine pivot 360°—one grinding head works both rails. Equipment is mounted on carriage which traverses between rails on ball bearings running on steel guides.

Pivoted foot-clamping device with automatic release holds grinder firmly against rails during slotting. Cutting wheel handle is spring-mounted and hinged, giving perfect control over depth of cut made by 8" wheel. Track wheels are insulated—no interference with train signals. V-belt drive simplifies operation and maintenance.



COMBINATION CROSS GRINDER AND SURFACE GRINDER. MODEL P-38 — Economical — dual purpose — two grinder heads. Has narrow cutting wheel for slotting and removing overflow metal at rail ends, and straight 1¼"-thick wheel for surface grinding. Limiting device prevents track gouging while surface grinding. Special hand wheel permits back-and-forth oscillation of machine for grinding.

Machine is light, portable, for quick handling under traffic. Clamping device holds track wheels tight to rail during cutting. Gears are totally enclosed. 6 hp air-cooled gasoline engine and grinding equipment are mounted on transverse carriage operating on ball bearings over steel guides.

Ingenious spring-tension device permits uniform slotting. Power transmission is by V-belts—adjustable—makes maintenance simple. Machine comes equipped with swivel-top "stool" to facilitate turning from one side of track to the other.

LEARN MORE ABOUT THESE AND OTHER RTW TRACK MAINTENANCE MACHINES—WRITE TODAY FOR LITERATURE

Railway Track-work Co.

3207 KENSINGTON AVE., PHILADELPHIA 34, PA.

TRACK MAINTENANCE MACHINERY

Rail Grinders • Swith Grinders • Cross Grinders • Surface Grinders
Rail Drillers • Ballast Extruders • Bit Sharpeners • Tie Nippers
Grinding Wheels • Cut-off Wheels • Track Liners

the economy of quality
Since 1914 SCHAEFER brake appliances have proven over and over again that the best brake rigging is the cheapest
SCHAEFER 7X14
PATENTED
SCHAEFER 5X10
Designed with greatest strength at points of greatest stress, Schaefer Details do not fail in service. By using better grade steel and greater care in manufacturing, Schaefer patented devices give safe and dependable freight car braking service for many years.
At car repair shops throughout the country, you will see forgings marked "SCHAEFER" being reapplied, not replaced, when cars are being rebuilt. This is the economy of Schaefer quality; you won't buy two sets of foundation brake rigging for one car; one carset of Schaefer Details will give car-life service.
SCHAEFER
EQUIPMENT COMPANY
Railway Brake Appliances and Drop Forgings
KOPPERS BUILDING
PITTSBURGH, PA.

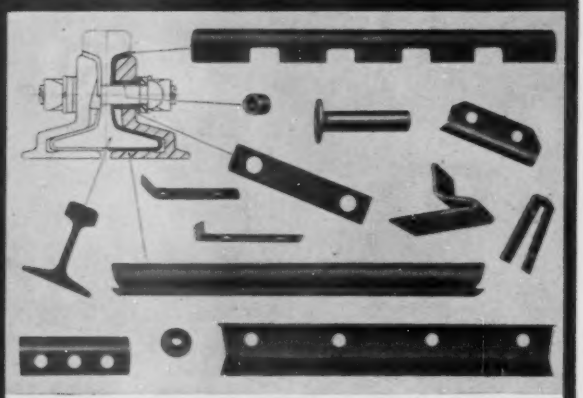
Let C-D-F flexible tapes
and C-D-F Diamond® track fibre

help solve your electrical insulation problems

FOR WRAPPING HIGH-HEAT COILS

C-D-F insulating tapes, for Class B and Class H applications, offer the electrical advantages of Teflon*, silicones, and mica with the physical strength of glass fiber, Mylar†, and other backing materials to meet the widest range of use conditions. High dielectric strength and low loss, high heat-resistance, long life, *reduced re-winding costs for your motor shops*—these are the benefits from the use of C-D-F insulating tapes.

*Du Pont's trademark for its tetrafluoroethylene resin
†Du Pont's trademark for its polyester film



RUGGED, DEPENDABLE TRACK INSULATION

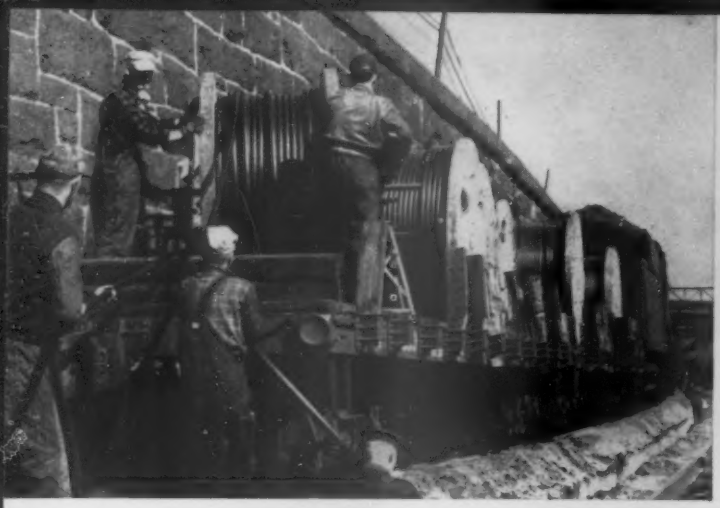
Diamond Track Fibre is accurately machined into armored and non-armored insulation for joints, head and base plates, end posts, bushings, switch and gage rods. Nothing is left to chance in its manufacture; rigid process control assures uniform high quality, freedom from metal particles, and a ruggedness that withstands the heavy impacts of fast-moving rolling stock. Track-maintenance costs come down when you use C-D-F Track Fibre!

WANT THE WHOLE STORY on C-D-F insulation for railway electrical equipment? Ask your C-D-F sales engineer (listed in Pocket List of Railroad Officials) or write for catalogs, samples, and technical bulletins covering your most urgent insulating needs.

CDF CONTINENTAL DIAMOND FIBRE
CONTINENTAL DIAMOND FIBRE DIVISION OF THE BUDD COMPANY, INC.
NEWARK 6, DELAWARE

OKONITE CABLES

...as reliable as the railroads they serve

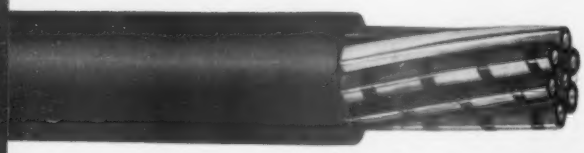


SIGNAL

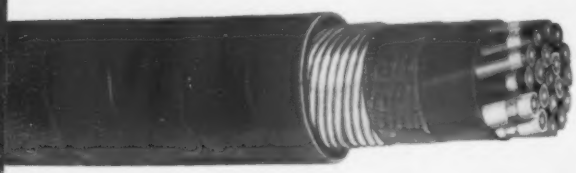
dependability — for circuits that must not fail

Safe movement on all roads depends on signal and control devices — interlockings, switches, retarders, dwarfs, etc. In turn, such devices depend on electrical circuits that must not fail.

For 78 years Okonite cable constructions have proved their durability on these key operations. And keeping pace with the railroads' own developments, we have added appropriate new cable constructions. Today, the two service-proved constructions shown below represent the most practical, reliable cables available for signal service.



Okonite-Okoprene signal and control cables afford **double** protection — a tough Okoprene sheath on the individual conductors as well as over the cable core assembly. This dual protection does not require a lead sheath yet provides a rugged, light-weight construction with excellent resistance to moisture, heat, acids and alkalies.



Okonite's CM-OT* construction provides all the protection of Okonite-Okoprene **plus** the additional safeguard of a corrugated bronze tape. This feature adds unusual compressive strength and forms a barrier against insects and rodents. Designed primarily for direct burial, CM-OT's light weight also makes it ideal for aerial or duct installations.

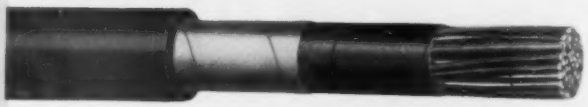
*U. S. Patent #2722562

COMMUNICATION

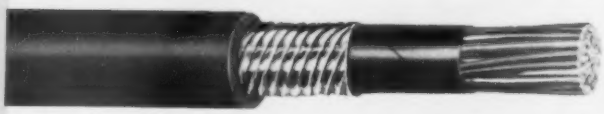
experience — to meet your exact requirements

Okonite is a particularly good source for communication cables because our engineers can draw from all known methods of cable manufacture to select the one cable which exactly fits your needs.

Okonite has had long experience in the fabrication of rubber, neoprene, polyethylene and polyvinyl chloride insulations and protective coverings. Shown below are just two of the many Okonite communication cable constructions now in use on Class I railroads throughout the country.



Typical of the diversity of Okonite constructions is this 26-pair #19 solid communication cable. Individual conductors are insulated with Okolene (polyethylene) twisted, cabled, layer Okolene tape, bare copper shielding tape, Okoseal (polyvinyl chloride) sheath overall. This cable is especially useful for aerial and duct installations.



For direct burial installation, this corrugated metal with an Okoseal sheath overall (CM-PF*) provides the advantages of both metallic and non-metallic coverings. The corrugated bronze tape protects against rodents and insects; the moisture-resistant Okoseal sheath prevents chemical or electrolytic corrosion of the tape; and this composite covering provides unusual mechanical strength.

SPECIFY OKONITE CABLES

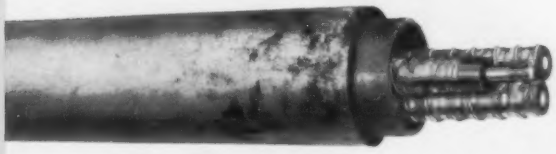
POWER

leadership — in every phase of power transmission

Major public utilities — experts in power transmission — have relied on Okonite cables for vital power circuits since 1878. This acknowledged leadership has also been recognized by the railroads, where power transmission is equally important.

Typical railroad applications are for station power, traction power, electrically-powered bridges, submarine crossings, generator and transformer leads, locomotive and car shop wiring, etc. Varnished cambric cables are available for service up to 28,000 volts; Okolite-Okoprene up to 35,000 volts; paper-insulated up to 69,000 volts; and in Oilostatic systems up to 230,000 volts.

A greater quantity of high voltage cable made with Okolite insulation has been installed in this country than with any other rubber insulation. This famous oil-base insulation, combined with its Okoprene sheath, forms Okolite-Okoprene — probably the best-known cable in the power field. We recommend it without qualification for normal service up to 35kv.



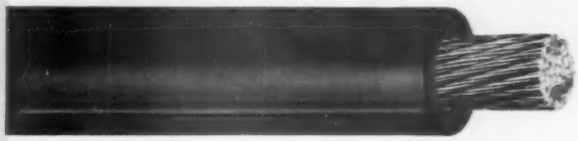
Safest known method of carrying ultra-high voltages is Oilostatic. This system, developed by Okonite, transmits electrical power through paper-insulated conductors immersed in oil under pressure in a steel pipe. Oilostatic systems for use in tunnels or for other restrictive locations are easy to install, self-supervising and require but negligible maintenance. Actually, the first commercial Oilostatic installation was made for a railroad.

MECHANICAL

quality — maintained by continuous testing and research

Research and testing are uppermost at Okonite — a fact which helps account for the remarkable service records made by our Diesel Locomotive and Car Wiring. To maintain Okonite's reputation for reliability, one out of every six of our employees is engaged in testing and inspection. Only by such scrupulous attention to quality can the demands of the railroads be met.

The first rubber-insulated, neoprene-sheathed Diesel Electric Locomotive Wire was made by Okonite — just one of many pioneering constructions made available to railroads by Okonite.



Okonite-Okoprene Diesel Electric Locomotive Wire is designed specifically to withstand the four main sources of trouble in Diesel circuits: heat, moisture, oil and mechanical abuse. Constructons are available for both conduit and exposed installations; for the latter, a heavier Okoprene sheath is applied and reinforced for extra toughness.

Okocord flexible cords and portable cables are a combination of flexibility and toughness. Flexibility is achieved by using fine-gauge wires which are twisted to a specified short lay. And long life is imparted to the sheath by curing the entire assembly under pressure in a metal mold. Finished product is resistant to flame, oil, moisture and abrasion.

FOR EVERY RAILROAD USE

A famous "First" in railroad history . . .

No list of "famous firsts" in railroad history could be complete without this 1893 picture. It shows the first low voltage, motor-operated automatic semaphore signal ever used on any railroad in the world.

. . . and still using Okonite today

Today an electric semaphore signal — faster in its action — also using Okonite signal wire stands in almost the identical spot, controlling train operations on the same line of the Central Railroad of New Jersey.

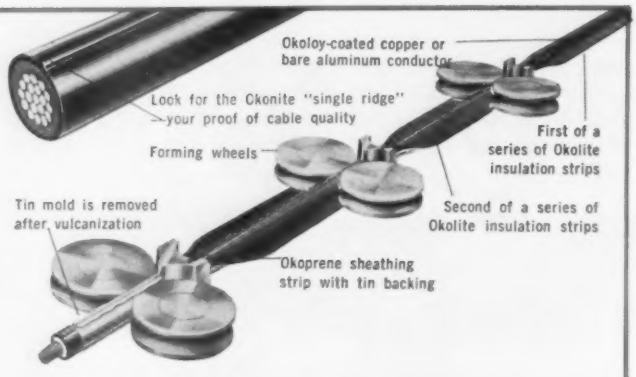
used by more than 100 class 1 railroads

Okonite cables offer the railroad purchaser the highest possible degree of electrical circuit reliability. From the inside out, each component is selected for one purpose only: to assure maximum service life and maximum dependability. Take Okonite-Okoprene, for example. These construction features and manufacturing methods are your insurance against premature cable failure:

1. **Okoloy lead-coated copper conductors** — Tests and experience show that Okoloy protection will outlast commonly used "tinning" by at least 2 to 1.
2. **Okonite insulation** — This insulation's electrical and physical properties are truly outstanding. But its 78-year record of successful railroad performance is its best testimonial.
3. **Okoprene sheath** — Okonite made the first neoprene-sheathed cables well over 20 years ago. These very cables — today — after continual exposure, are still in excellent condition.
4. **And, finally —**

OKONITE'S FAMOUS STRIP-INSULATING PROCESS

This is the only method known that assures perfect centering of the conductor, uniform vulcanization, uniform thickness of the insulation, and allows every foot of compound to be electrically and visually inspected before and during the insulating process. The Okonite Company is the only cable manufacturer who uses the strip insulating process in standard production. It is your assurance that the cables you buy will be as reliable as the railroads they serve.


Okoloy-coated copper or bare aluminum conductor
Look for the Okonite "single ridge" your proof of cable quality
Forming wheels
First of a series of Okolite insulation strips
Second of a series of Okolite insulation strips
Tin mold is removed after vulcanization
Okoprene sheathing strip with tin backing

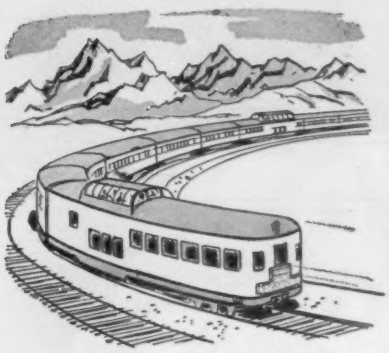
For detailed information, technical data and dimensions on all types of Okonite railroad cables, write for Bulletin OK-1078.

THE OKONITE COMPANY

Passaic, New Jersey

Branch Offices	Atlanta, Ga. Birmingham, Ala. Bluefield, Va. Boston, Mass. Chicago, Ill. Cincinnati, Ohio Cleveland, Ohio	Dallas, Texas Denver, Colo. Detroit, Mich. Houston, Texas Jacksonville, Fla. Kansas City, Mo. Los Angeles, Calif.	Memphis, Tenn. New Orleans, La. New York, N. Y. Philadelphia, Pa. Pittsburgh, Pa. Portland, Ore. Roanoke, Va.	St. Louis, Mo. Salt Lake City, Utah San Francisco, Calif. Seattle, Wash. Syracuse, N. Y. Wilkes-Barre, Pa.
Field Warehouses	Birmingham, Ala.	Chicago, Ill.	San Francisco, Calif.	Syracuse, N. Y.

we have a brand spanking new hat in the ring



—to win your vote on the transportation ballot. Our platform is built on a solid foundation of efficient, dependable service for all shippers; a service backed up by the most modern type of equipment and facilities including electronic communication and control.

. . . .

For travelers, there are superbly styled Domeliners featuring Astra Dome dining cars, Astra Dome observation lounge cars and Astra Dome Coaches. Both Pullman and Coach equipment is the finest on rails.

. . . .

We suggest you nominate Union Pacific as your choice when shipping or traveling through the West.

Union Pacific Railroad

OMAHA 2, NEBRASKA

GA CX
GATX
if you PRODUCE or SHIP or
it pays to plan with GENERAL

GENERAL AMERICAN TRANSPORTATION CORPORATION

135 South La Salle Street • Chicago 90, Illinois

Offices in Principal Cities

Write for General American's brochure— "Services and Products"

Car Operating Division

Over 62,000 freight cars in *leased service:* GATX tank cars; Airslide® cars for dry granular materials; GATX box cars; GARX-URTX refrigerator cars; and 38 repair and maintenance plants throughout the country to service this fleet.

Car Building Division

Designs and builds all types of freight cars. Plants at Sharon, Pa. and East Chicago, Ind. Research laboratories develop new methods and new types of cars for industry.

Tank Storage Terminals

Six strategically-located terminals store any liquid that flows through a pipeline. Completely private storage can be leased as needed. Dock, drumming, blending and packaging facilities available.

Plate and Welding Division

Designers and manufacturers of custom-built welded vessels in steel, alloys, aluminum and other non-ferrous metals. Specialists in plate fabrication. Plants at Sharon, Pa., East Chicago, Ind., Birmingham, Ala., and Orem, Utah.

Field Erection Division

Field erectors of storage tanks, gasholders, petroleum conservation structures, bins, pneumatic conveying equipment, coolers, pre-heaters and process equipment.

Process Equipment Division

Designers and manufacturers of drying, cooling and dewatering equipment; Turbo-Mixers and mixing devices; and other heavy machinery and equipment for the chemical, food, distilling and other process industries.

Plastics Molding Division
(and Sutorbilt Corporation)

Material handling and process equipment that increases production. Fuller Airslides®, Airveyors®, pumps, compressors, blowers, grey-iron castings, pre-heaters and coolers widely used in the food, feed, chemical, cement and other industries.

Parker-Kalon Division

P-K fastening devices quality-controlled to assure accurately formed fasteners. Self-Tapping screws, wing nuts, masonry nails, set and socket screws to fill exacting industrial requirements.

Kanigen® Division

The Kanigen process introduces a brand-new material to industry. Kanigen chemically produces a hard, uniform, corrosion-resistant coating of nickel-phosphorus on low-cost metals including aluminum.

Wiggins Vapor Seals

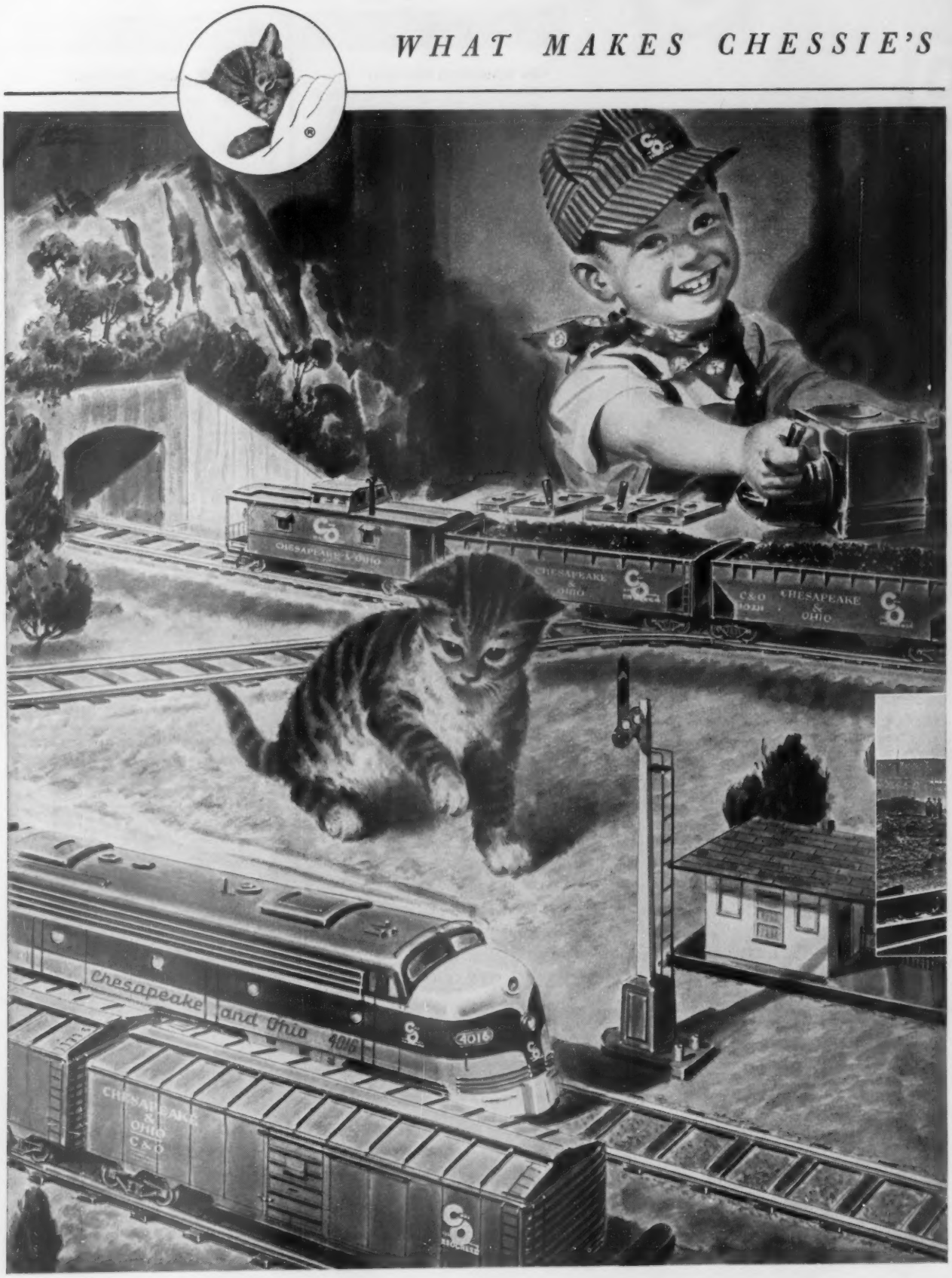
Floating roofs, dry-seal lifter roofs, dry-seal gasholders—conservation structures on storage tanks—built by the Plate and Welding division to prevent losses of volatile vapors in petroleum storage.

Fuller Company
(A General American Subsidiary)

Materials handling and process equipment that increases production. Fuller Airslides®, Airveyors®, pumps, compressors, grey-iron castings, pre-heaters and coolers widely used in the food, feed, chemical, cement and other industries.

Export Division

Marketers of General American products and services available through foreign representatives or licensees throughout the world. For further information, write Export Dept., 380 Madison Ave., New York 17, N.Y.


WHAT MAKES CHESSIE'S
Chesapeake and Ohio
4016
CHESAPEAKE & OHIO
C&O

RAILROAD GROW? *One of a series telling what Chesapeake and Ohio is doing to make this a bigger, better railroad.*

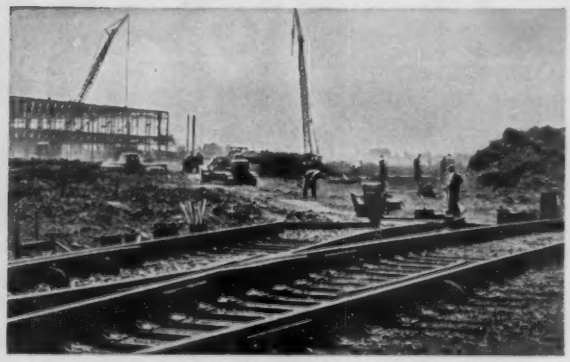
Full speed ahead!

That's the order of the day on Chesapeake and Ohio, starting with the forward thinking needed to develop superior transportation today—and in the future.

Full speed ahead on modernization. Since 1945 C&O has spent over a half billion dollars on modernization, with another $100 million budgeted for this year. In this decade, Chesapeake and Ohio has become almost a new railway.

Full speed ahead on new equipment. With 222 more diesels on order this year, C&O's fleet of locomotives will become completely dieselized. Over 90% of its 88,000 freight cars are new or rebuilt and 13,000 new cars are on order.

Full speed ahead for freight. New, more efficient classification yards, terminals and signal systems make up a track improvement program costing $20 million, assuring faster, dependable schedules for freight shipments. On Lake Michigan, C&O's fleet of seven train-ferries has been completely modernized. At the other end of the railroad, a new $8 million bulk cargo pier is nearing completion at C&O's Atlantic port of Newport News.



Typical of the new plant tracks is this 3-mile C&O spur to serve Ford's huge new Lincoln Plant at Novi, Mich.

Full speed ahead for coal. As the world's largest carrier of bituminous coal, Chesapeake and Ohio keeps pace with the growing coal industry. Sixteen million tons of quality coals will be loaded into Great Lakes vessels at C&O's Toledo docks this year and more than 17 million tons will be hauled to Newport News for ocean movement. C&O loads almost half of the coal America exports overseas. A $3 million addition will increase the loading capacity of C&O's coal docks at Newport News by 20%.

Full speed ahead for service to new industry. C&O is adding new plant tracks at a cost of $3 million to better serve the transportation requirements of the automotive, coal, chemical and other plants locating on the railroad.

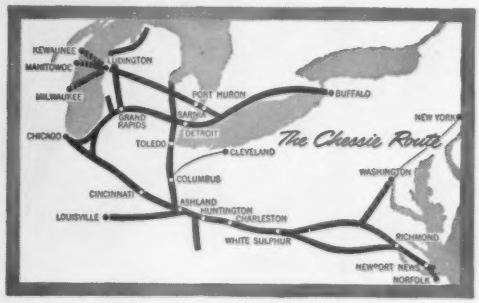
All along Chesapeake and Ohio's 5,100 miles things are happening—new facilities, new thinking for a bigger, better railroad to serve your transportation needs.

Chessie's railroad is going and growing!

Would you like a portfolio of pictures of Chessie and her family? Write to:

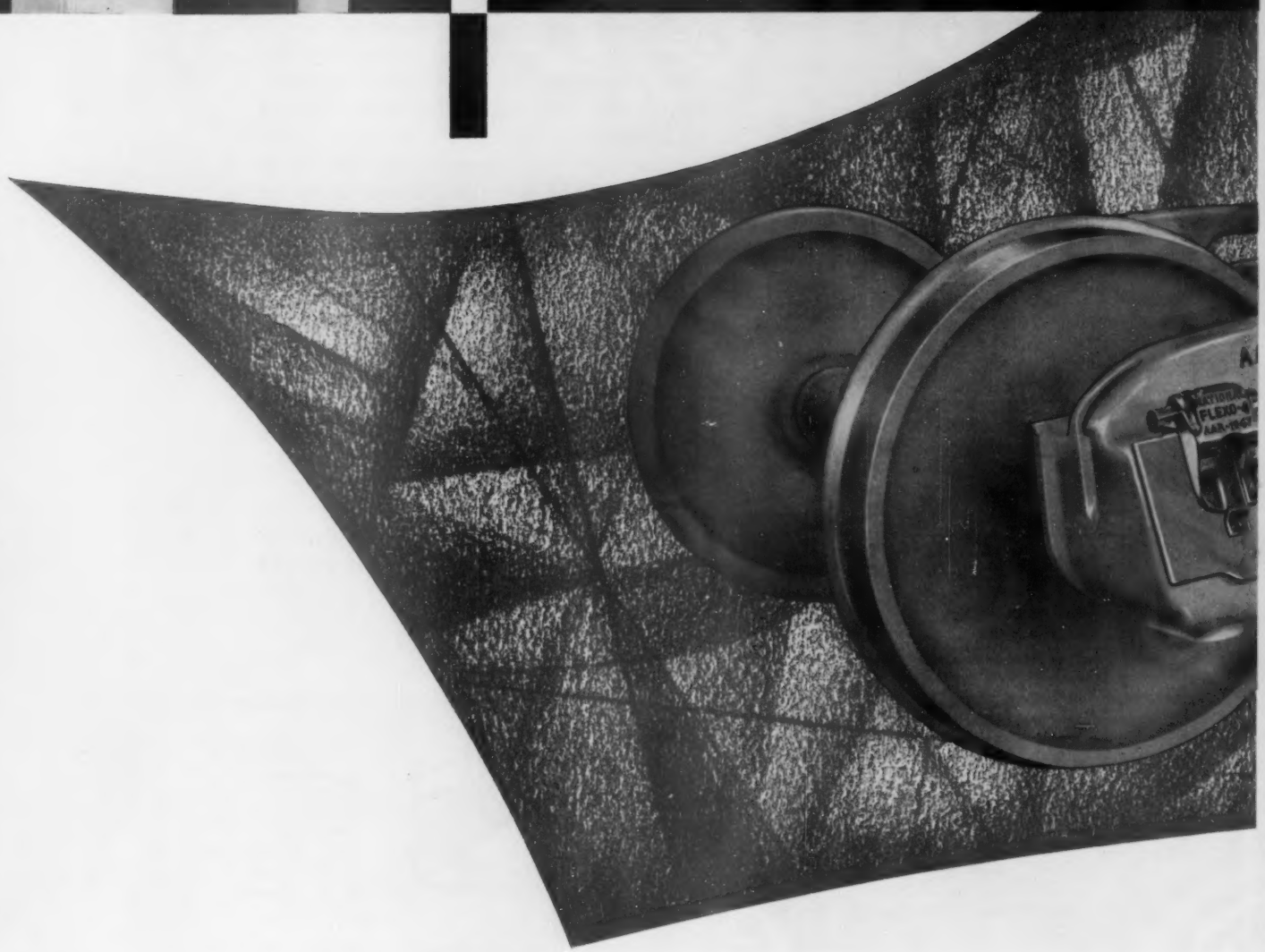
Chesapeake and Ohio Railway

3817 TERMINAL TOWER, CLEVELAND 1, OHIO

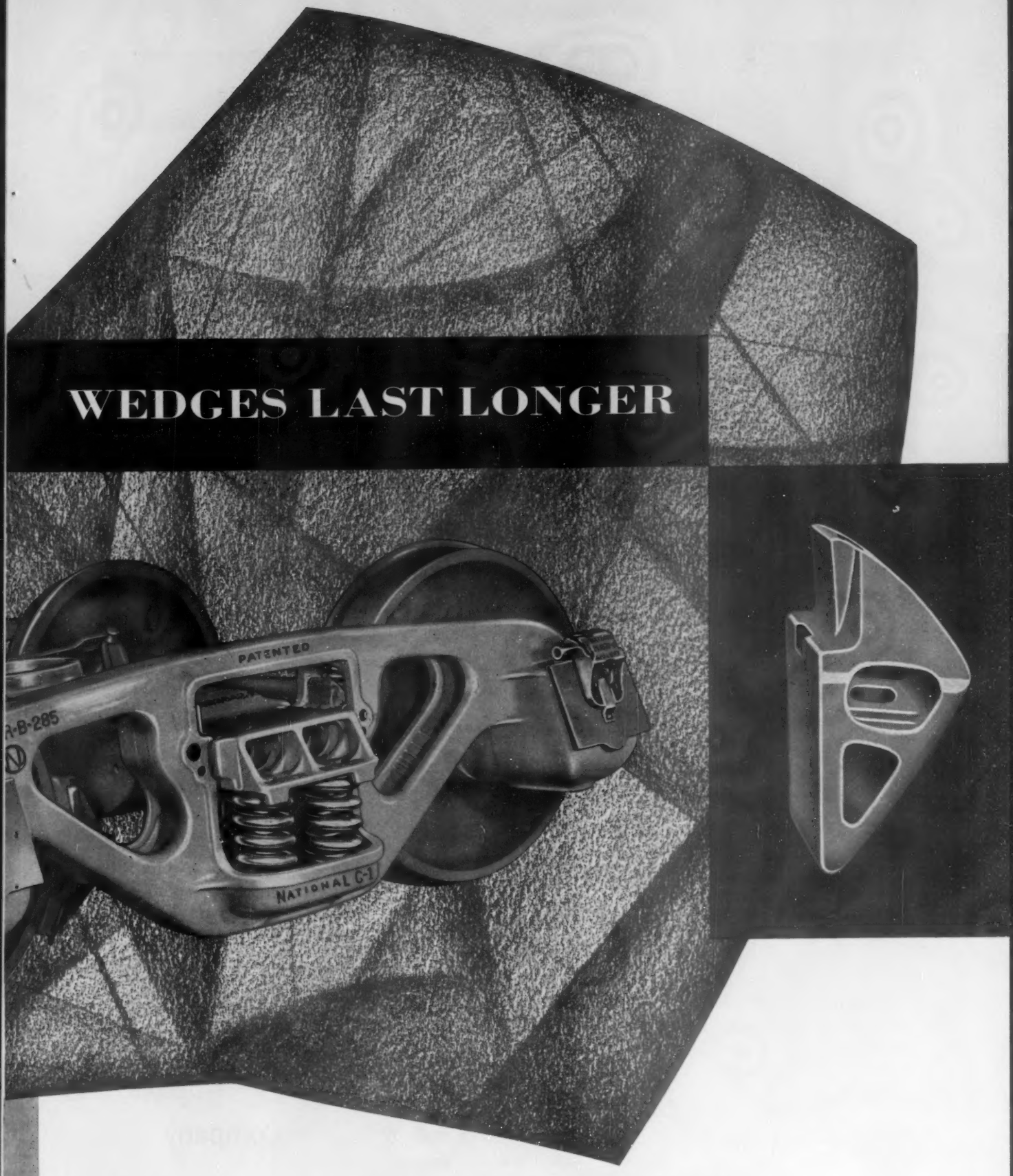


There's Improved Railroading with National Specialties

Reason: C-1 TRUCK

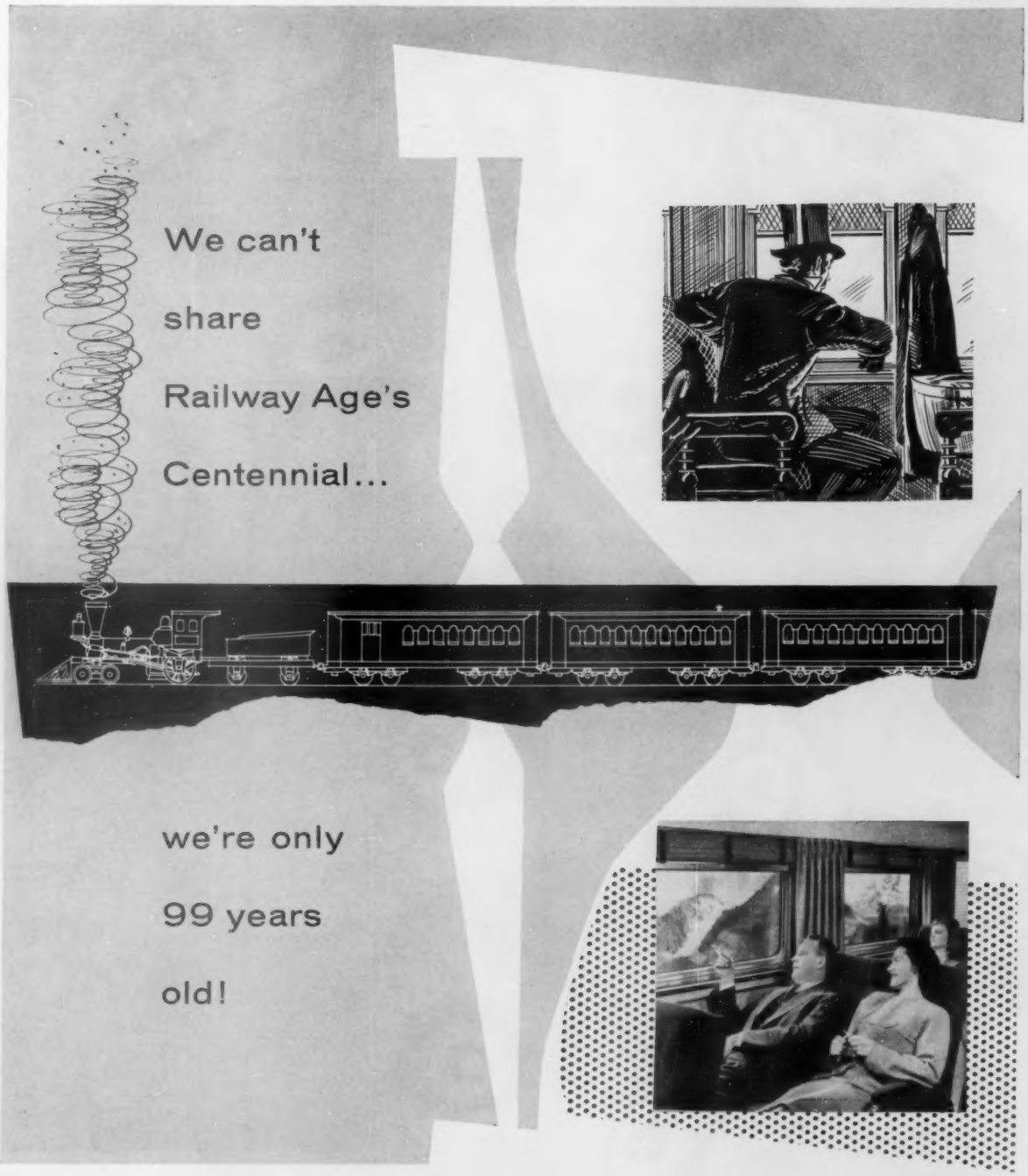


COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • SNUBBER PACKAGES • JOURNAL BOXES



NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 *Cleveland 6, Ohio*



It would be nice if we could say that we've been working with Railway Age for 100 years, serving the rail industry. But shucks, we've only been doing it for 99 years. Railway Age got a year's jump on us.

It's been a *good* 99 years, though, and when Railway Age celebrates its next century of service in 2056, we expect that Adlake equipment will be, as it is now, used on every American railroad.

Established 1857 Adlake 99th year

The Adams & Westlake Company

Elkhart, Indiana · New York · Chicago

Manufacturers of ADLAKE Specialties and Equipment for the Railway Industry.

...Starting the Second 100 Years

THE OPPORTUNITY AHEAD

If the goal of railroading is more dynamic growth, the *bases* from which the effort must start need appraisal

A FORECASTER LOOKS AT . . .

Traffic for the Next Ten Years

By CHARLES F. ROOS
Chairman, Econometric Institute, Inc.

Freight traffic has its origin in the production and distribution of goods. Some stems from industrial production and distribution; some from agricultural production and distribution; and some from construction activity.

These three kinds of production show a high correlation with total intercity ton-miles of freight traffic by all carriers. In fact, except for the war-originated bulge in freight traffic, an almost perfect relationship has been found. Econometric's formula, based on this correlation, is explained separately herewith.

The accompanying table shows the correlation between commodity production and freight traffic with a forecast running through to 1967. By this method Econometric expects (within 5 to 10% either side) that intercity ton-miles will reach 1,772 billion by 1967, an increase of 43% compared with the 1,237 billion hauled by all carriers in 1955.

The closeness of the relationship means that all the efforts of industry to reduce freight hauls by relocations with respect to markets and material supplies have been negated by population shifts, changes in supplies of raw materials, and the growth in favorably located large manufacturing companies which have been able to offset freight charges with reduced overhead and manufacturing efficiencies.

It is here assumed that the relationship between intercity ton-miles of freight and the commodity production index will be stable during the next ten years. In short, it is assumed that forecasts of commodity production can be readily translated into equally reliable forecasts of intercity ton-miles of freight.

The proportion of intercity ton-miles carried by the railroads has fallen considerably over the years. In 1940 railway revenue ton-miles (including electric railways, express and mail) were 61.30% of intercity freight traffic, public and private. The rail percentage was 71.28 in the war year 1943—when railway traffic was almost twice its 1940 level; motor vehicle traffic was off about 10% from 1940; traffic on the inland waterways was up only about 20%; and traffic on pipelines was up about 40%.

Since the 1943 peak the percent of railway revenue ton-miles of total intercity ton-miles has shrunk each year until 1955, when it reached about 49.5%. The sharpest decline developed in 1944 when pipeline traffic increased about one-third; in 1948, when railway traffic decreased and traffic on each of the other forms of transportation increased; in 1949, when railway traffic decreased substantially, inland waterway traffic declined moderately, pipeline traffic decreased a little, and motor vehicle traffic actually increased; and in 1951, when railway traffic declined a little, motor vehicle traffic and inland waterway traffic rose substantially, and pipeline traffic increased moderately.

Some of the percentage changes cited above developed as a result of greater or smaller percentages of heavy goods in commodity production; some were the result of substantial changes in capacities of competing forms of transportation; and some stemmed from relative changes in transportation rates and other competitive conditions.

Unavailable Tonnage

Rising labor costs generally suggest that fluid freight will move by pipelines wherever possible. Therefore, most pipelines already in service will be used and some new ones will be built, since the petroleum and gas industries are still growing relative to the national economy. One transcontinental railroad has constructed 844 miles of pipeline to carry refined petroleum products into Arizona.

In our forecast we make the

WHAT THIS ARTICLE PREDICTS

The ton-miles of freight traffic of the United States, by all carriers, will rise from 1,237 billion in 1955 to 1,772 billion in 1967, an increase of 43%. This forecast is based upon the expectation that commodity production will increase and that the total volume of freight traffic will follow that trend.

The author believes that the railways' share of total intercity ton-miles established in 1955—namely, 49.5%—may have been rock bottom. He believes the railroads can get a larger share of the total if, among other things, they (1) get equality of treatment from the government, (2) price competitively, (3) provide more specialized equipment, and (4) exploit piggyback. He particularly emphasizes the need for better forecasting.

If the railroads do these things, Dr. Roos believes they may improve their share of the growing total of intercity ton-miles by perhaps 4% during the next 10 years.

In recent public statements, President James M. Symes of the Pennsylvania observes that that property is making plans for a 43% increase in ton-miles by 1965.

WHO THE AUTHOR IS:

CHARLES FREDERICK ROOS is a distinguished economist, statistician and mathematician.

After university teaching and research in mathematical economics and statistics, he became permanent secretary of the American Association for the Advancement of Science. In 1933, Dr. Roos became principal economist and director of research for the National Recovery Administration. A year later he turned in a report recommending that the Recovery Act be allowed to lapse in June 1935, and resigned, to become research director of the Cowels Commission for Research in Economics.

In 1938 Dr. Roos organized the Econometric Institute. He is a member of the International Statistical Institute—whose membership is limited to 300, from which there are about 35 from the United States. He is a fellow of the Institute of Mathematical Statistics, a fellow of the American Statistical Association, a fellow and past president of the Econometric Society, and is a member of the Committee on Mathematical Statistics of the National Research Council and chairman of its subcommittee on industrial management.

He is chairman of the board of the Econometric Institute and president of Concord Fund, a mutual investment trust.

assumption that during the next ten years pipelines will carry more than the 16% of intercity ton-miles handled in 1955. A reasonable estimate might be 17%. This would leave only 83% of the future intercity ton-miles to be divided among the railways, motor vehicles, and inland waterways.

That part of the intercity motor vehicle traffic which represents more or less local deliveries of beverages, soft drinks, bakery goods, petroleum products and the like is also not available to the railroads. Also not available to them, without substantial investment, is the short-haul traffic between plants with off-track locations. Likewise, some part of inland waterway traffic cannot reasonably be captured by the railways —i.e., there are some inherent advantages possessed by the water carriers. The total of all such non-available traffic of the motor and water carriers must amount to more than 15% of total intercity ton-miles.

The above considerations indicate that no more than two-thirds of intercity ton-miles is competitively available to the railroads. This calculation means that, if there is no new major war or other unforeseen catastrophe that will affect adversely the competitors of the railroads without also affecting the roads seriously, the percentage of intercity ton-miles hauled by the railroads is not apt to come even close to the 71.28% attained in 1943.

HOW TO INCREASE THE RAILROADS' SHARE

A substantial part of the competition of the railroads stems from unregulated, or loosely regulated, and directly or indirectly subsidized carriers. These include barge lines, common and other motor vehicle carriers, and to a small extent aircraft. Hauling of exempt commodities, particularly agricultural, is widespread. Contract carriers are relieved from publishing their actual rates; and highways and airports are being improved at public expense.

In contrast, railroads are actually required to pay taxes on the "enhanced" value of their properties arising from crossing eliminations. Again, the 3% transportation tax

ECONOMIC ACTIVITY VS FREIGHT TRAFFIC

Year	Commodity Prod. (1947-1949=100)	Equivalent Intercity Ton-Miles (billions)	FRB Industrial Output	Construction	Agricultural Output
1947	99	876			
1948	103	914			
1949	99	876			
1947-1949	100	863.2			
1950	112	997			
1951	119	1,061			
1952	122	1,089			
1953	131	1,172			
1954	125	1,117			
1955	138	1,237	139	174	112
1956	141	1,264			
1957	146	1,311			
1958	151	1,357			
1959	156	1,403			
1960	161	1,449			
1961	166	1,495			
1962	171	1,541			
1963	176	1,587			
1964	181	1,634			
1965	186	1,680			
1966	191	1,726			
1967	196	1,772	205	225	139

WHAT ECONOMETRIC INSTITUTE IS:

—A research and advisory organization whose clients include several hundred corporations with combined assets of more than $150 billion. With headquarters at New York, Econometric terms itself: "An organization for the measurement and interpretation of economic forces."

Virtually all of Econometric's findings are intended for internal consumption by its clients and its forecasts rarely appear in magazines.

Among its specialties are studies of cities, with emphasis on steps they must take to avoid decay and blight. It is Econometric's intensive study of Pittsburgh that started off the program which has transformed that city through the combined efforts of government and business leaders.

charged on common carrier service does not apply to traffic moving in private carriage; and, as a result, some shippers are setting up their own transportation systems.

The railroads have, however, been conducting educational campaigns to arouse the public to all such inequities, and they are meeting with some success. W. A. Johnston, president of the Illinois Central, says: "We feel encouraged over the growing awareness of the public of its self-interest in the inequities of the transportation field. This is evidenced by the recommendations of the Cabinet Committee appointed by the President of the United States. As the public understands the extent to which its transportation costs are inflated by a lack of true competition, it can and will create conditions under which the economy of rail transportation will be realized."

Competitive pricing of transportation has been studied intensely by the Presidential Advisory Committee on Transportation, which has recommended that the common carriers be permitted "greater freedom, short of discriminatory practices, to utilize their economic capabilities in the competitive price of their service." While bills embodying the major portion of the recommendations of this committee "died" with the last Congress, legislation may be expected which will permit the railroads to recapture some traffic based on inherent advantages.

New Price-Making

Since World War II, the railroads have adjusted downward their rates on a long list of commodities on which the truck carriers, and to a lesser extent the water carriers, were increasing their haulage by cutting their rates or because of service advantages or both. This has meant a drastic departure from conventional rate making, a heritage from the time when "value of product" rather than service rendered bulked large as a factor in rate making.

How Econometric's Forecast Was Obtained

Since freight traffic for all carriers is generated by the production and distribution of its goods, Dr. Roos took the statistics on (1) industrial production and distribution, (2) agricultural production, and (3) construction activity; combined them with weights proportioned to the value added by production; and produced a single index of "commodity production," with 1947-1949 taken as 100. (The latter is a copyrighted series, exclusive with the institute.)

He found this index produced "extremely close" correlation with total intercity ton-miles of freight traffic by all carriers. (The sole exception was that traffic during and immediately after the war comprised a heavy movement of war material not measured by the commodity index, as well as high percentages of durable goods production to make up wartime wear and tear.)

This almost perfect relationship between commodity production and freight traffic can be expressed by the following simple, straight-line formula:

Commodity production
x9.23
—36.8
= intercity ton-miles

By this means Dr. Roos produced a forecast of all freight traffic for each year through 1967. In making his prediction he assumed that the relationship between intercity ton-miles and the commodity production index would be stable during the next 10 years. In short, he assumed that forecasts of commodity production can be readily translated into equally reliable forecasts of intercity ton-miles of freight.

Industrial Output

Industrial production, the largest component of commodity production, has worked irregularly upward for many years. Part of the long-term increase can be traced to population growth and part to rising living standards and shorter work weeks made possible by technological progress. These trends will probably continue during the next ten years; but the rates of change may well differ from the historical values.

During the past ten years the number of live births has risen from 3.4 million per year to 4.1 million. During the same period life expectancy from birth has risen from about 65 years to 70 years. For the past three years the number of births has only varied from 4.0 million to 4.1 million; and the peak rate during the next ten years may be reached in 1956 at 4.1 million, since the number of women 18 to 24 will change very little and the number 25 to 34 will actually decrease.

Nonetheless, under favorable conditions of employment the number of births will probably range between

The change has become necessary because the value of cargo has little, if any, influence on the rates charged by motor carriers.

There is today increasing awareness among railroad officers that the time-honored concept of "value of service" in rate making requires severe modification; that in many cases "value of service" cannot be considered an intrinsic property of the commodity being transported, but must instead be recognized as the cheapest alternative cost available to the shipper. As Arthur E. Baylis, vice-president—freight traffic of the New York Central, says, "In setting freight rates that will produce the maximum benefits to railroads, more attention must be given to the cost of providing the service rather than to the theory of what the traffic will bear."

The railroads, although able, because of their inherent nature, to provide lower cost transportation of many commodities, have been denied this privilege. In many instances, the railroads have proposed reduced rates on commodities that would have contributed substantially to meeting their overhead burden, and to profits, but they were required by government regulatory bodies to withdraw such rates because they were considered (1) lower than necessary to meet competition, or (2) less than could profitably be met by competing forms of competition.

Also in many instances where truck competition has been severe, proposals by a railroad to reduce rates to meet such competition have been opposed by other rail lines and by shippers on the theory that the adverse effect upon established differentials in rates and prices would place them at competitive disadvantages.

Role of Costs

The eastern railroads have done some preliminary research into the question of relationship between rail and truck costs and rates. In today's climate, it would be a good guess that such work will eventually be expanded. Such studies are bound to show ways in which rail rates can be set to recapture some traffic. And legislation along the line of the Weeks Committee's report ought to make possible a complete overhaul of the rail rate structure to make it much more competitive with motor carrier and inland waterway transportation. Therefore, as the president of a large Eastern road says, "A new process which allows transportation rates to gravitate to their natural economic levels will mean a greater proportion of business for the railroads."

The greatest loss of intercity traffic by the railroads has been in the shorter hauls. Freight rates for these short hauls generally have been high and, in addition, motor carriers have demonstrated superior performance with respect to time in transit, convenience, costs of loading and unloading, and damage to lading. This is difficult competition to meet without completely revamping rates and services.

In recent years, motor carriers have been cutting into the long-haul traffic, but the railroads are now fighting back. This they are doing

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3.6 million and 4.1 million. Life expectancy will probably increase further, but in view of the great medical discoveries of the past ten years and the resultant practical elimination of many killer diseases, it may be brash to extrapolate the trend of life expectancy. Nonetheless, some increase is indicated. **Consequently, population must be expected to increase at an annual rate well above the rates prevailing in the years before World War II.**

The rate of technological progress may very well accelerate if the Federal Reserve Board forsakes the Keynesian ideas of investment, heeds the mandate of the Employment Act of 1946, and provides an adequate supply of money. Even if the board continues its forays on business as in 1948 and 1953, a decrease in the proportion of the population in the working ages, 18 to 65, will put high premiums on further mechanization and other methods of cost reduction. **Hence, except for the possibility of monetary malmanagement, demand for, and production of, machinery and equipment ought to be quite high.**

On the Farms

During the past ten years agricultural production has not increased in line with population. One reason is that this has been a period of further replacement of draft animals by farm machinery and equipment. Land previously used to produce feed for draft animals has been released for growing crops and livestock for human consumption. These trends are likely to continue further and result in more or less chronic farm surpluses. Sometime between 1962 and 1968 a new balance between agricultural and industrial production is apt to be struck.

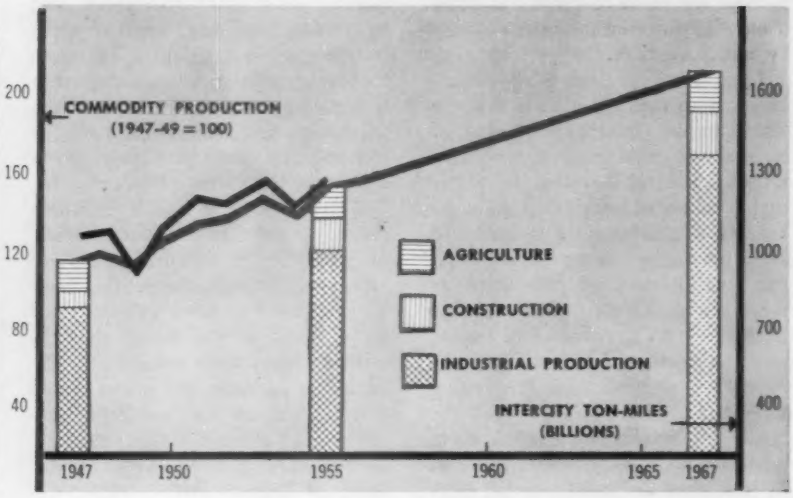
Construction activity, the remaining component of commodity production, is apt to increase somewhat from current levels. New residential building at the current rate of 1.2 million units annually would be a little more than adequate to take care of needs arising from new family formation of 800,000 to 950,000 per year and demolition and other losses at the current rate of 240,000 units per year.

At the present level of residential construction there would be some increase in vacancies unless the rate of demolition should rise. On the other hand, industrial and commercial construction is apt to respond to the same pressures that are likely to lead to higher levels of production of machinery and equipment, and the needs for new schools and highways have not yet reached their peaks.

Commodity production and its components seldom conform exactly to their long-term trends in any one year. Sizable variations in any year are apt to arise from either inventory accumulation or liquidation and such variations obviously cannot be forecast accurately several years ahead. Consequently, variations of 5% to 10% from the forecasts of intercity ton-miles presented here are to be expected from time to time.

COMMODITY PRODUCTION AND INTERCITY TON-MILES

Forecast: Intercity ton-miles (black) will match the rise in production (red)



by acquiring specialized equipment, establishing combinations of rail-truck service, and meeting competitive rates. **Such new life suggests that the railways' 49.5% of total intercity ton-miles established in 1955 may have been rock bottom.**

Shipper-Slanted Cars

Special equipment, which will permit the railways to give better service than competitors, is being acquired by roads all over the country. For example, there is a steady trend toward handling commodities in large quantities in bulk; and to meet this condition the railroads are increasing their fleets of covered hopper cars and "Airslide" cars for handling food products such as sugar and flour.

Other types of special cars being acquired by the railroads include gondolas for chips; bulkheaded flat cars for pulpwood and plasterboard; specially equipped box cars for handling automobile assembly and other parts; DF and compartmentized cars for a wide range of commodities which require special protection in transit; special cars for handling coiled steel, etc., cushioned underframe cars; rack cars; and insulated box cars.

In the matter of special equipment, the railways have one important advantage over the motor carriers. Special equipment can be acquired only by investing large amounts of capital and such capital can be obtained more easily and at lower cost by large companies which have investment status.

On the other hand, increasing competition is forcing motor carriers to merge and, as the number of large motor carrier companies increases, the present competitive advantage of the railroads will diminish. Furthermore, large industrial and distributing companies can also readily finance special carrier equipment designed to meet their own needs.

The railroads have by no means fully exploited their competitive advantages with respect to special equipment. For example, instead of working out long-range programs with car builders and thereby getting the lower prices resulting from mass production, steady employment and continuous engineering research, they have irregularly ordered equipment on a short-term, opportunistic basis. In addition, this short-term policy has often resulted in unavailability of equipment when most needed. If a surplus of cars is not available at peak loads, both temporary diversion and permanent loss must be expected.

Need for Planning

Careful long, intermediate, and short-term forecasts of traffic load and the courage to plan equipment purchases to meet these forecasts would improve the competitive position of the railroads. But instead of scientifically forecasting requirements from commodity production and econometric studies of industries in their territories, most railroad managements have been content to ask their shippers what their requirements will be over the next few months. The results of these methods have, of course, been disappointing.*

By simply projecting the trend of recent months, railroad management itself could have obtained as satisfactory results and saved the cost of the opinion survey. This is not surprising, since the majority of shippers were projecting trends and guessing instead of making scientific forecasts; a sum of guesses is still a guess.

The railroads also need car rentals set sufficiently high to encourage car ownership and the building of surplus cars.

Related to the problem of car equipment is that of services in yards and terminals. A number of new "push button" type yards are being built with tower-control loud speakers, increased track capacity, and streamlined running-repair shops. To increase train speed and minimize delay long and more strategically placed passing tracks are being

(Continued on page 180)

*Thor Hultgren, "Forecasts of Freight Movement," in **Short-Term Economic Forecasting**, National Bureau of Economic Research, New York, 1955; Robert Ferber, **The Railroad Shippers' Forecast**, Bureau of Economic Research, University of Illinois, 1955; and C. F. Roos, "Summary of Economic Forecasting Techniques," **Econometrica**, 1955, pp 281-282.

Mr. Faricy Looks Around

PROGRESS OF A CENTURY A PORTENT OF WHAT'S AHEAD

One hundred years ago, when the magazine which is today Railway Age was launched, railroad tracks were of light iron instead of heavy steel. Locomotives burned wood in fireboxes and no one had yet dreamed of today's motive power which burns oil directly in engine cylinders. In 1856, there were neither standard gage, nor standard time, nor standard couplers and brakes, nor any other of the standard railroad facilities and practices which are the foundation of today's continent-wide commerce. In 1856, automatic signals, safety locks, centralized traffic control, gravity switching, electronic communications—all were still in the future.

With that kind of record of advancement in the century just past, what may be said of the railroads in the century ahead? Just this—that never in the long history of railroading has there been a period which promises to be more productive of improvement than the present. The processes of study and research, the application of ingenuity and imagination, which started when railroads started and which have never stopped, are driving ahead today on a broader front and with greater intensity than ever before.

The business of prophecy is always risky and prophesying about railroads carries with it a special risk of understatement rather than overstatement.

Who, one hundred years ago, could have foreseen the railroads of today? Who, today, can say with any degree of certainty what the advances will be in the next century?

Of this much we can be sure—that as the nation grows its railroads must grow in strength and capacity, for only on railroads, in trains of cars on tracks, is it possible either now or in the future to meet the tremendous transportation needs of this country with the efficiency and economy which the country requires. Only on railroads is it possible, and will it continue to be possible, to produce maximum transportation with minimum demands upon manpower, fuel and materials.

And we can be sure of another thing—that the railroads of the future will be better physically than the railroads of today, just as the railroads of today are vastly better than those of the past.

If there is any uncertainty as to the future, it is not whether the mass transportation of the country will be carried in trains of cars on tracks, or whether science and invention can make available new and improved facilities and processes. The uncertainty is whether investment funds will be available to finance the future—for railroad improvements require investment on a vast scale, and such investment must be based on earnings or the prospect of earnings. Thus the brightest hopes for the future are still subject to the limitations of available and prospective earnings.

During the years 1946 through 1955 the railroads spent some $11 billion on additions and betterments, including more than 21,000 new locomotives, nearly 600,000 new freight cars and a vast variety of other capital improvements which make for better service to the public, more efficiently produced. Total expenditures for at least the next decade, barring serious and unforeseen reversals, and granted adequacy of earnings, will no doubt exceed the already accelerated rate.

This, indeed, will be necessary if the railroads are to participate ratably in the expected growth of the nation's economy. It is predicted by well informed experts that the population of the United States will be close to 190 million in 1965, as compared with approximately 165 million now. That means another 25 million persons to be fed, clothed, housed and transported, while it is estimated that the total national output of all goods and services, now close to $400 billion a year, will exceed $500 billion in 1965.

To retain and to increase rail participation in the nation's total traffic, the railroads must further intensify their efforts, individually and collectively.

As one of the foremost steps in

The Author...

... president of the AAR since 1947, W. T. Faricy began his railroad career in 1914 as an attorney with the Chicago, St. Paul, Minneapolis & Omaha in his home state, Minnesota. As the top executive officer of the Class I railroads' industry organization, representing the industry in contacts with the government and the public, Mr. Faricy is recognized as the spokesman for the railroads in matters of nationwide concern.

these efforts, the years ahead should see the overcoming of any substantial or long continued deficit in freight car ownership. The installation of an average of 75,000 new cars each year, costing at present prices some $600 million, is a considered probability, though largely dependent upon adequate earnings as well as the availability of steel and other necessary materials.

These new cars will be stronger, more economical to operate and to maintain and more adaptable to shippers' requirements. Improved procedures in loading, including the increased use of mechanized loaders and compartmentizing of lading, will be extended. Mechanical refrigeration will be adopted increasingly as it becomes more adaptable to a wider range of protective services. The use of "piggyback" transportation of freight, as well as that of demountable containers, will add to the flexibility of movement.

Higher Yard Production

Developments in repair and overall maintenance practices and the application of new techniques and devices in both terminal and over-the-road operations will secure better utilization and higher daily mileages from the freight car fleet.

Increasingly, yards will mean movement, rather than holding facilities, and movement which will be controlled more smoothly, safely and economically. For example, the electronic computer in an automatic retarder system, controlling each retarder to release cars at the proper speed, will come into greater use.

The modernization of some yards, the relocation and complete rebuilding of others, the extensive adaptation of electronics, including radar, radio and television—all these make it possible to clip precious time from freight schedules, to effect savings in car rentals, and to reduce damage.

The same kind of advances which are in prospect for yard operations will be achieved in operations over the road. At the foundation of such operations is the track. Multiple tampers, track aligners, ballast cleaners, powerful tractors and crawler shovels, and other products of an alert technology have transformed the work of track maintenance.

This process will continue as the task of maintaining and relaying track becomes increasingly one for men handling machines, rather than for men wielding pick and shovel. The track, moreover, will be of stronger, longer-lasting rail—much of it welded into continuous lengths of a quarter-mile or more—laid upon more durable ties, resting upon a more effective bed of ballast and a better-drained and more stable subgrade.

This betterment of track conditions will be keyed to the higher sustained speeds of the trains of the future. Motive power is a vital factor in accomplishing and increasing these speeds. In little more than twenty years, the railroads have successfully accomplished a switch to diesel power. Newer types of locomotives, including the gas turbine-electric, the coal-fired gas turbine and the rectifier type locomotive in railway electrification, are the subjects of intensive research and development. And meanwhile the diesel continues to undergo refinement and improvement.

With improved power and better cars moving on straighter, flatter, smoother and stronger tracks, the flow of railroad traffic will be further facilitated through increasing realization of advanced ideas in railroad signaling and communications. Radio on trains, and connecting trains with offices, perhaps combined with the eyes of television, will likely be almost as much in use as the telephone is today. Installations of centralized traffic control, combining many of the advantages of multi-track operation with the economies of single track, will continue and increase.

In the field of passenger traffic, experiments with new types of trains and new services will be pushed in a determined effort to transport more riders at less cost. A major factor in stimulating travel will be ultra-modern units of equipment, some designed for relatively short journeys, others emphasizing the spacious comfort and even luxury of rail travel on journeys of greater length.

Other incentives to increase travel will include faster and more convenient schedules without sacrifice of comfort or safety; attractive plans for family fares, group fares, special excursions and the like; extended use of rail travel credit cards and arrangements for rental of automobiles in conjunction with travel by rail and, perhaps as important as any of these, greatly improved arrangements for simplifying and expediting reservation and ticketing procedures.

Improvement in the railroad passenger situation in the years ahead will depend not only upon what the railroads themselves do but also upon the degree of understanding of the realities of that situation on the part of the public.

Railroad management will have at its command in the future still more fantastically swift computing machines to facilitate the gathering, calculating and analyzing of facts and figures upon which management judgment, decision and control must be based.

On the Threshold

Looking back over the past century, particularly over the more recent decades, it is easy to realize the giant strides the railroads have made. They now stand on the threshold of an even more challenging, more demanding era. Yet it should be, at the same time, a more highly productive era, for a better tomorrow is as basic to the railroads as the railroads are to the nation.

Looking to that better tomorrow, the railroads are constantly at work on improvement. No one believes that the present plant, equipment or service is the ultimate. But to effect improvements on that plant, equipment or service takes more than ingenuity. It takes earnings — adequate earnings for which, under a system of private ownership and business operation, there is no substitute. It should never be forgotten that privately operated railroads cannot levy taxes or print money but must live on what they take in.

With a greater degree of equality among the several forms of transport in matters of regulation, taxation and subsidy, there is no reason to doubt that adequate earnings could be realized. And if that comes to pass, there is no reason to doubt that the same forward urge which has brought the railroads so far in the century just behind us, will carry them on to an era of better service, more efficiently and economically produced, in the century ahead.

Proposition: Railroads Will Grow with the Economy . . .
Postulate: If They Can Exercise Their Advantages

By WILLIAM H. SCHMIDT, JR.
Executive Editor, Railway Age

"*An engineer is a man who can do with one dollar what any damn fool can do with two.*"

This definition by Arthur M. Wellington, an associate editor of the Railroad Gazette during the eighties, and author of the monumental "Economic Theory of Railroad Location" (1887), is also a good test of the economic value of any business to the citizens of the country it serves. Transportation is so complex a business and so infiltrated with contrasting influences of government aid, taxation and repression, that it is easy to lose sight of the main criterion in judging the transportation business—namely, what value does it give for what the country as a whole spends on it.

RAILROADS HAVE BASIC TECHNICAL EFFICIENCY

By this measurement the railroads score high:

1. They possess the lowest ratio of deadweight of equipment to carrying capacity of any form of transportation. Throughout their history this ratio has progressively improved.

2. They combine the best elements of "retail" transportation and "wholesale" transportation. With the freight car they provide the customer with a retail "package" (like the truck). But, for the job of movement, they convert this retail unit into mass transportation by coupling the units into trains for movement by a single source of power, with a single crew.

3. Moving vehicles on rails makes it possible to use a mobile power plant which will haul a train from 10 to 30 times its own weight. The hauling capacity of this power plant increases much more than proportionately to the weight added in obtaining it.

4. A railroad has a wide range of speed.

5. The railroad attains the highest efficiency in the use of fuel of any land or air vehicle—100 gal of refined petroleum will move seven times as much freight when fed to a railroad diesel as when burned in a motor truck.

6. Once its fixed property is manned, the railroad achieves an extraordinarily low ratio of labor to traffic. Freight trains of 75 loaded cars—considered small today—are moved by five men. To move the same volume by highway would require twice as many trucks, each costing more than a freight car, and 15 to 20 times as many men.

The assets the country gains from its railroads may be summed up thus:

Railroads are the only mass producers of transportation that go everywhere, that are not tied to natural ways and that, in all weather and seasons, move all types and quantities of freight and passenger traffic. They perform this service at basic costs which are lower than, or compare favorably with, the true costs of all other forms of transportation.

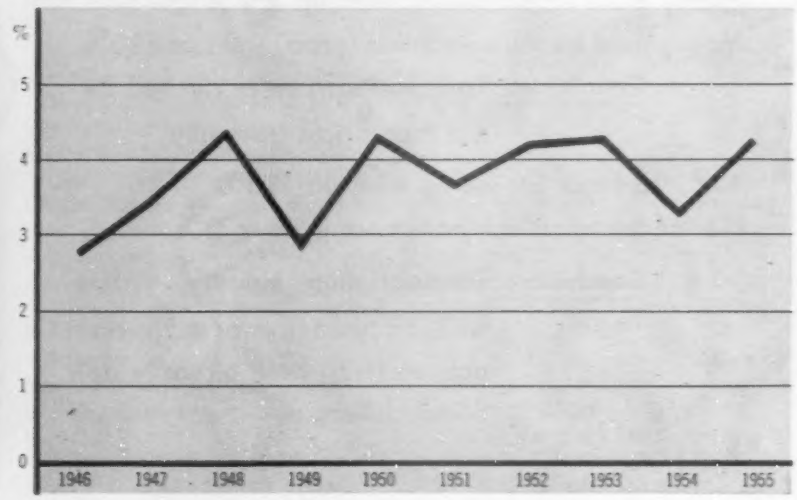
MASS TRANSPORTATION FOR MASS PRODUCTION

This is a mass production economy. It will become more so. It will need more and more mass transportation as its expansion goes on.

RATE OF RETURN ON NET INVESTMENT

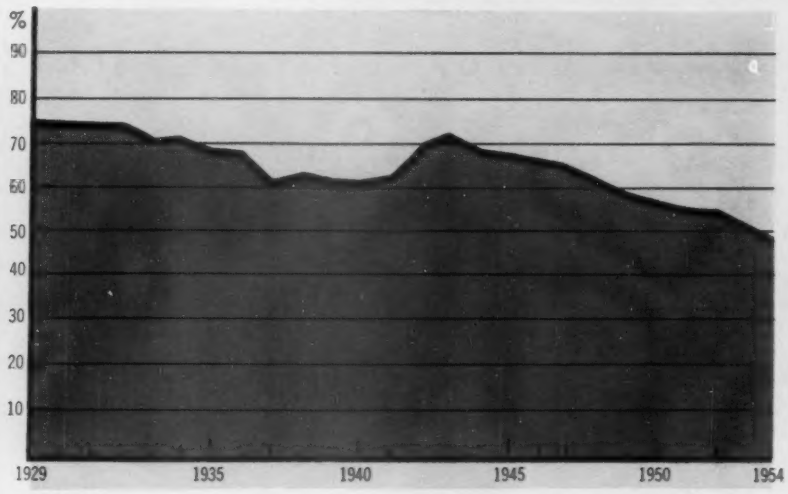
(1946-1955)

The railroads' earnings have been inadequate



PER CENT RAILROAD TON-MILES OF TOTAL

In 25 years, railroads' share of intercity freight has fallen from 75% to less than 50%



One of the major problems facing this economy is the high cost of investment in new transportation plant. Cities are finding, for example, that just to keep pace with motor traffic will take more money than they have in sight.

Fortunately, the railroads have enormous latent capacity in plant which already exists. To handle greatly increased traffic they need chiefly only additional rolling stock —except in limited boom areas; relatively small outlays would be required on the fixed plant.

This is not true of water, air or truck transportation—all of which, to get increased capacity, would require large quantities of capital (public or private) for additional fixed facilities.

An outstanding example of this absorptive capacity of the railroads is their performance in World War II. In 1944 the *additional* traffic alone handled by the railroads compared with 1940 exceeded by 50% *all* the traffic other forms of transportation had moved in 1940. Among other things, the railroads took over the entire movement of waterborne oil to and along the east coast without the addition of fixed facilities and with only a trifling increase in cars—none in motive power.

THE TROUBLE WITH THE TRANSPORTATION BUSINESS —IN A NUTSHELL

(Comparing 1954 with 1929, height of the previous boom)

Country's production went up — 97%

Transportation ton-miles (all forms) went up — 93%

Conclusion: Transportation kept pace

Money paid to producers went up 254%

Money paid for transportation (gross) went up 120%

Conclusion: Transportation rates climbed far less than prices generally

Net income of producers went up 173%

Net of transport companies went down 3%

Conclusion: Transportation industry is less well off than it was 25 years ago, in terms even of vastly deflated dollars.

NOTE: "Production" is that of agriculture, mining, construction and manufacturing. "Net income" is before taxes.

ABILITY TO SERVE AS COMMON CARRIER

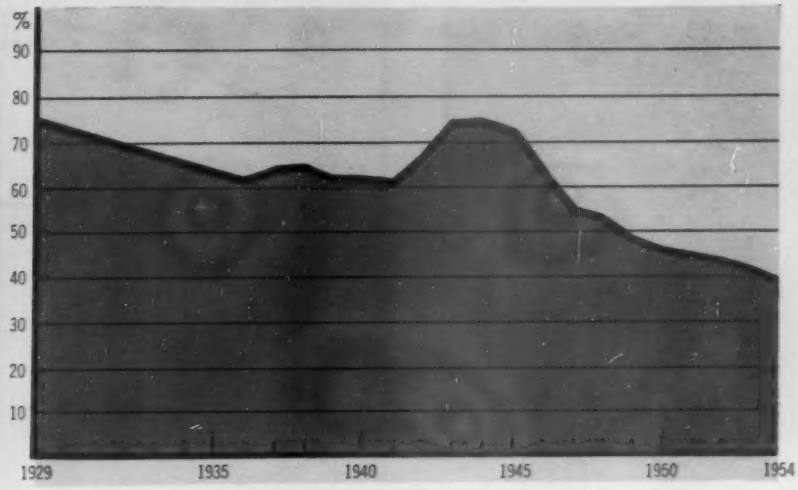
This inherent technical efficiency gives the railroads a unique ability to serve the country as a common carrier. Provided the level of traffic is high enough, the railroads can meet this obligation and remain financially healthy. The railroads now manage to absorb extreme fluctuations in traffic; their competitors are not required to—nor can they—bear this burden.

The railroads are the only true

PER CENT RAILROAD PASSENGER-MILES OF TOTAL

(non-commutation)

In 25 years, railroads' share of intercity passenger travel by public carrier has fallen from 75% to less than 40%



common carriers, accepting all kinds of traffic at all times. The cost of this obligation to them is the expense of providing standby facilities.

There are an increasing number of shippers who provide, by truck or barge, for their own minimum transportation requirements, with full loading of their equipment in both directions. They use the railroads only to the extent necessary to correct the imbalance in their traffic and to accommodate peak and emergency movements. There are others who give their clean and heavy loading traffic to captive transportation, using the railroads only for "feathers and lamp shades" and articles which damage other lading.

A modern industrial country cannot get along without common carriers. It can rely upon the railroads to continue to serve as mass common carriers because, by its very nature, railroad plant is admirably suited to that kind of job.

There is one condition: The railroads cannot continue to bear the obligations of the common carrier unless they have a chance to fight for a high level of remunerative traffic.

LOW COST ONLY WITH LARGE VOLUME

The essential efficiency of the railroad requires volume of movement which utilizes profitably the capacity of the plant. In these times—to absorb at least partially the impact on cost of continuous inflation—both traffic and capacity should be expanding.

Only one-third of the present investment in the railroads comprises locomotives and cars. Two-thirds is in fixed properties—right of way, tracks, yards, controls, shops, stations and offices. Only 20% of railway operating expenses are directly incurred in running trains. The rest are indirect. Thus the principal expenses of running a railroad are those required to keep the property in shape to serve. These expenses are related closely to the plant's potential capacity.

Society gains when this plant is used at near capacity.

TRAFFIC LEVELS ARE TOO LOW

This goal is not being achieved. Ton-miles of freight moved by the railroads have just about held their own over the years since the end of World War II. But this is a result of longer average hauls given railroad freight. The trend in carloadings has been downward. The trend in passenger-miles has been a much steeper decline.

More important, the railroads are handling less and less of the available traffic, as shown by the accompanying charts of their share of freight and passenger traffic, respectively.

True, part of this loss is a natural result of technological progress. Some freight and more passengers have been lost because the motor vehicle can do better some of the jobs the railroads used to have to do, before the paved road, the internal combustion engine, and the rubber tire were economically married.

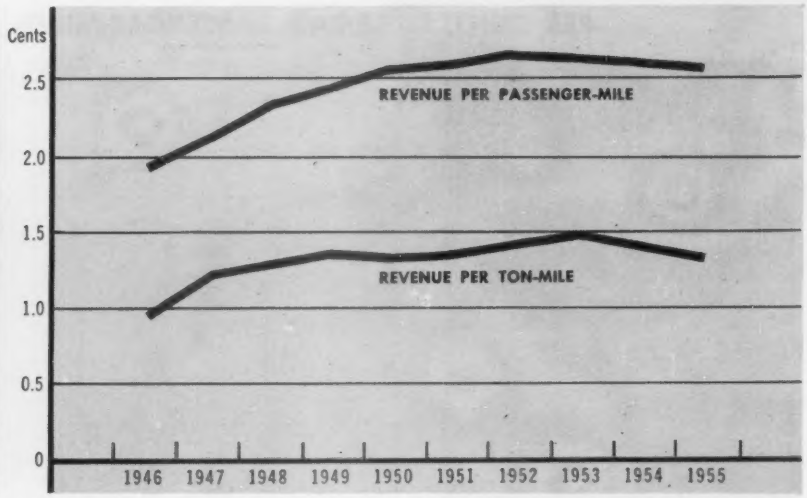
But, in freight traffic at least, the railroads are failing to share sufficiently on the whole to enable them to get the best out of their plant. Particularly have they lost the high-rated traffic moving in concentrated volume and yielding the highest profit to the carrier. Ancient regulatory bonds on the railroads force them to meet inflation with across-the-board rate increases—which inevitably result in raises too high for high-rated traffic, driving it off the rails, and insufficient to make compensatory the rates on the low-rated traffic remaining to the railroads.

THE BAD RESULT HURTS THE PUBLIC

The inevitable result of this traffic trend is poverty of net earnings for the railroads, with a rate of return over the past decade of only 3 or 4%. This is based on actual depreciated book value of the railroads of about $27 billion. At today's prices the costs of reproduction of railroad property would be at least three times as much.

This continuous failure to earn a reasonable return seriously impairs the railroads' efforts to attract capital

Railroads' "take" has not matched postwar price inflation



and credit. Without these they cannot finance the full modernization of plant and equipment necessary to provide, for all, the full advantages of the railroads' mass production characteristics.

Scarce funds have had to be carefully rationed, with highest priority, first, to projects most urgently needed to provide capacity, and, second, to those which will yield the highest immediate savings in operating costs. Thus, immediately after World War II, more money was invested in diesel power than anything else. On some properties, investments yielding as high as 40 to 70% return a year—like new classification yards and automatic crossing protection—have had to be deferred, because dieselization was even more urgent. Many companies are faced today with the hard choice—whether to channel limited funds into new freight cars, which may be off their lines most of the time, or cost-saving investments which will help preserve a narrow margin of profit.

MANAGEMENT GETS BEST OUT OF WHAT IT HAS

By all the standard indices of efficiency over which railroad management has control, the railroads recently have bettered an already inherently high basic technical efficiency. They have achieved, over the past quarter century, an enormous increase in basic operating efficiency. Comparing the close of 1955 with that of 1930, the carriers have raised:

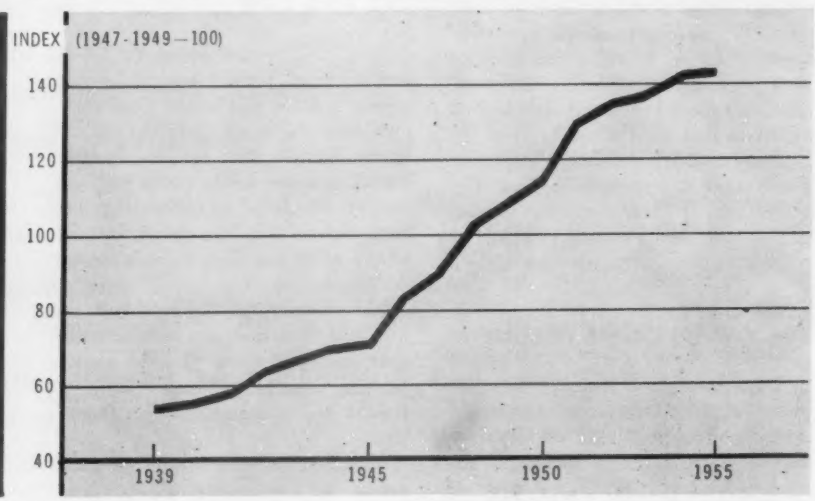
Gross ton-miles per freight train-hour	115 %
Net ton-miles per freight train-hour	133 %
Daily mileage active freight locomotives	64 %
Daily mileage active passenger locomotives	89 %
Net tons per train	75 %

Other measurements of efficiency —like the average load of a car and daily mileage of freight cars—are not wholly controllable by railroad management and depend upon the level of trade and use of equipment by shippers and receivers.

Over the last decade, the revenue collected for moving a passenger a mile has gone up only 33%, that

COMBINED WAGE RATES AND CHARGE-OUT PRICES

Railroads' expenses have skyrocketed



for moving a ton of freight a mile, only 40%—and this from rate levels frozen throughout inflationary World War II. The pay to the railroads for their work has actually decreased for each unit of work performed in both passenger and freight services since 1953.

THE WAY TO REAL HEALTH IS CLEAR

For railroads of maximum usefulness, present trends in revenues and traffic must be reversed. Health can be achieved, railroad executives agree, if:

1. Gross inequalities in taxation and public aids are ended—at least reduced;
2. The laws governing transportation are changed to recognize the universality of competition and the natural protection afforded to shippers by the ability to provide their own transportation; and
3. The common carrier railroads are given the right to price competitively to reflect their inherent advantages.

From healthy railroads the country will gain:

1. Increased efficiency of an already inherently efficient form of transportation;
2. The lower relative unit cost which traffic volume related to railroad capacity will bring; and
3. The protection of an absolutely essential common carrier service for which there is no substitute.

As concluded by John W. Barriger, new president of the Pittsburgh & Lake Erie, in his "Super-Railroads—For a Dynamic American Economy":

"The consuming public, as well as the railroads, are direct beneficiaries of all measures calculated to promote near-capacity use of railroad plant. . . . The margin of profit will be increased by physical improvements that improve train and yard operation, and by a reduced ratio of investment per mile compared to revenue per mile—hence spreading the burden of all indirect expenses. In this way, growing density . . . enables the railroads to provide the public with an enormous volume of transportation at a very moderate price. No other means of transportation can haul so much, so far, for such little expenditure of man-hours, of fuel, and of capital."

The Transport Rivals – How They Stack Up

RAILROADS

NATURAL ADVANTAGES: Can carry large tonnages long distances at low cost; train-on-track principle gives lowest ratios of power and tare weight to load. Have fully developed network of controlled tracks with full interchange of cars. Intensive and extensive geographical coverage. Can transport goods of every type and passengers, individual or en masse. Faster over the road than water and, for long distances, than highway.
ARTIFICIAL ADVANTAGES: None. Railroads pay full cost and ad valorem taxes on all they have and all they use.
DISADVANTAGES: Render door-to-door rail service only where private sidings exist. High costs for right-of-way necessitate large volumes of concentrated freight or passenger traffic.

WATER CARRIERS

NATURAL ADVANTAGES: Ability to carry large tonnages over limited routes at low costs because installation and equipment costs are low and "roadways" do not deteriorate from use.
ARTIFICIAL ADVANTAGES: Pay no rent or other charge for use of public waterways, which are built and maintained at great expense by federal government. Local governments subsidize terminals.
DISADVANTAGES: Slow. Inflexible. Strictly limited in geographical coverage. Relatively high costs for transfer loading and unloading.

MOTOR VEHICLES

NATURAL ADVANTAGES: Flexible. Can operate door-to-door for almost any kind of shipment and size of load. Faster for short distances. Use standardized, mass produced vehicles; easy to enter business.
ARTIFICIAL ADVANTAGES: Have use of public highways, the cost of which they pay only in part; this network is tax free.
DISADVANTAGES: Relatively high operating costs on long hauls because tonnages carried are low in relation to power and labor costs. Cause damage to public highways and congestion in and near cities.

PLANES

NATURAL ADVANTAGES: Top speed on long-distance passenger and freight transportation. Suited for carrying emergency shipments, especially of small and light units, and for carrying highly perishable merchandise. Can span land and water in single trip without transferring cargo. Give extensive national geographical coverage—plus intercontinental.
ARTIFICIAL ADVANTAGES: Some get direct mail subsidies. All use at fees less than cost terminals which are constructed at public expense. All get airways from federal government without charge.
DISADVANTAGES: Performance too dependent on weather. Highest weight, fuel and labor ratio per ton-mile or passenger-mile of any carrier. Limited intensive geographical coverage.

PIPELINES

NATURAL ADVANTAGES: Highly efficient transporters of fluid products because they make full application of straight-line, constant-flow principles. Free from common carrier obligation to transport wide range of commodities.
ARTIFICIAL ADVANTAGES: None. No subsidy. Full taxation.
DISADVANTAGES: Can transport only liquids and gases or materials capable of being kept in suspension. High first cost for right of way and installation necessitates large volume of concentrated traffic.

Agenda for

Railroad management's prime task, as this chart reveals, is to lift traffic (ton-mile trend) to at least match activity in the country's economy as a whole (FRB index). Here are key phases of the job.

Here are the major steps the railroads can and should take to assure the future growth, prosperity and public service of the industry. These observations are, of course, "one man's opinion"— and the reader has a perfect right to disagree with the writer, either as to the inclusion of some recommendations or the omission of others. The observations are made rather dogmatically, with supporting evidence omitted, for space considerations—but the writer invites the comment and criticism of readers, and agrees to modify his expression in future issues of Railway Age, if convicted of error.

One quality these observations do not have is that of originality—the writer did not invent any of them. All of them are expressions developed from conversation and correspondence with competent railroad people.

Well, here goes . . .

Catch Up with Other Industry

The key to healthy survival of an industry—just as for survival of a race—is realistic adaptation to changing environment. The railroads are lagging behind in their adaptation. For example, since World War II, railroad traffic growth has fallen far behind the growth of other industry (Chart A). This has happened despite the fact that the relative economy of railroad movement is still far superior to that of other forms of transportation for all but a small fraction of total traffic. Railroad traffic volume should once more move upward with industrial production if the railroads (the regulators permitting) will give effect to the superior economy of their service, in the prices they charge for it.

Reduce the Internal Subsidies

When a railroad hauls commuters at less than cost or moves raw materials to a processing plant at a profitless price, these undercharged patrons are getting a subsidy. Subsidies have to be paid for by somebody—and where some railroad patrons are subsidized by below-cost pricing, it is other railroad patrons or railroad owners who foot the bill. Nowadays, it is pretty hard to pass the cost of such subsidies along to other railroad patrons (because, if overcharged, they are likely to shift their traffic to other types of transportation). Hence it is that the principal sufferers are railroad owners. The result is that investment in railroad plant improvement is minimized, and railroads' service to the public is a lot less modern than it otherwise would be.

Curtail the "Paper" Rates

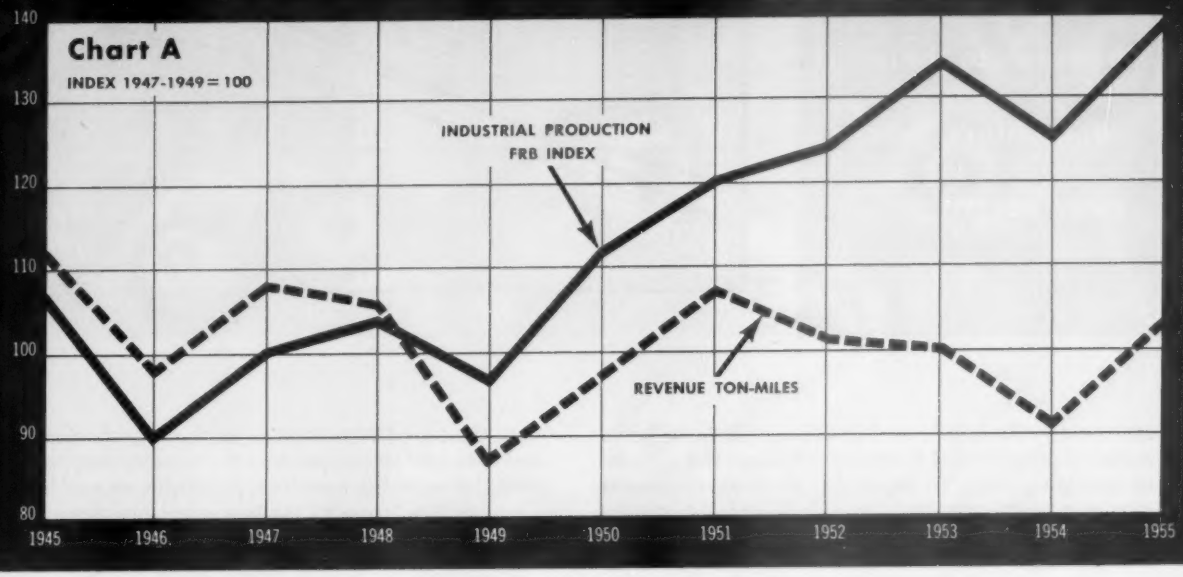
Many railroad rates which used to attract a lot of traffic now attract little or none. They are "paper" rates. It's all right to charge high rates for traffic you want to lose —but when such rates divert from the rails traffic they could handle profitably, they are a calamity. For example, many railroad rates on attractive traffic (i.e., low bulk in relation to weight) for distances over which heavy tonnage moves, are much higher than actual costs of movement by rail, and somewhat higher than costs of movement by rival agencies (Chart B). Such rates should be reduced to a point below costs of rival agencies, but safely above railroad costs.

Limit Below-Cost Pricing

While many railroad rates are unattractively higher than costs of rival transportation, there are other railroad rates which are improvidently lower than actual out-of-pocket railroad costs. Substandard rates on the movement of raw materials into processing plants are typical of this variety of out-of-date railroad pricing (Chart C). Below-cost railroad rates uneconomically deprive other agencies of transportation of traffic which rightfully

the Railroads

By JAMES G. LYNE, *Editor, Railway Age*



should be theirs. Hence they are injurious to the railroads and their rivals alike.

Apply Economics Internally

Some railroad pricing and other practices fail to recognize economic principles—the doctrines which point the way to maximum production of goods and services at minimum cost. The historic reason for this non-conformance is that railroad pricing practices were developed when the railroads had a monopoly of all except local transportation. There was then no danger that pricing based more on "value" than on cost would divert traffic to uneconomic channels of movement. Nowadays pricing which unduly ignores costs—and hence drives to trucks the freight that railroads should handle—is injurious to the railroads and to the national welfare.

Invoke Economics Externally

Most of the burdens with which the railroads are afflicted by government (e.g., burdensome regulation and one-sided favors to their rivals) are "*anti*-economic." That is to say, such inequitable treatment is injurious to the nation's income and living standards. To induce regulators, legislators and the public to remove these handicaps, it will be necessary to encourage people to think about transportation problems in terms of economics. The best way, probably, to induce economic thinking about transportation problems is for railroad people themselves to think and act economically about these problems. Only by striving, as hard as the regulators will allow, to govern their own actions by economic principles can the railroads demonstrate that restrictive regulation and inequitable treatment are really handicapping them in improving their service to the public.

Intensify Economic Studies

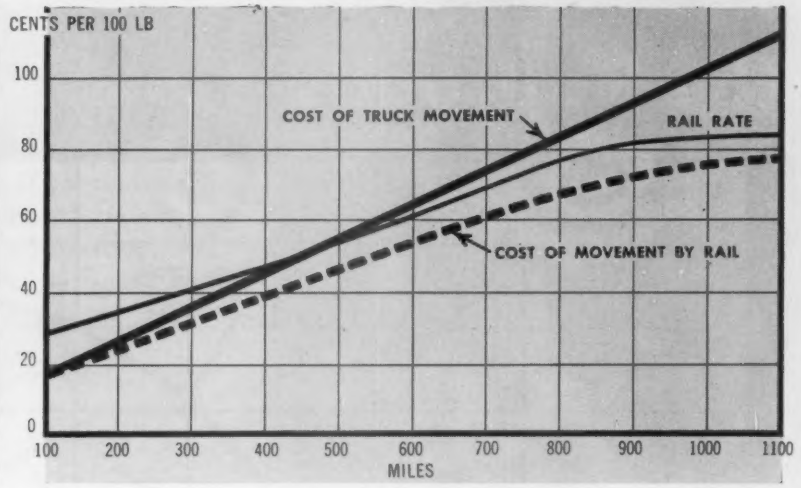
All of the railroad industry's serious problems lie in the field of economics—and in inducing political action to conform to economic reality. It follows that the public welfare, along with that of the railroads, will be advanced if economic studies in transportation are extended, intensified and publicized. Outside the field of transportation, most large industries employ competent staff economists. Scholars in our universities would devote a lot more of their skilled attention to transportation problems, if given greater encouragement.

Know Your Costs—and Your Rivals'

Relatively few railroads have satisfactory figures on the direct costs of moving principal commodities on their

(B) MANY RATES ARE TOO HIGH, ESPECIALLY FOR SHORTER HAULS

Railroads should underprice their competitors, where costs permit



own road. There is even less dependable information available about the cost to shippers of using rival agencies of transportation. To be useful, such figures cannot stop at actual rates; they must include incidental expenses incurred in the choice of a particular form of transportation. In the absence of railroads' own dependable cost computations, undue reliance is placed on ICC cost figures—which suffer the disadvantage that they are averages, hence do not reflect specific conditions on most railroads. Cost information, a generation ago, was of relatively little use for pricing purposes. Today, such information—and action upon it—may well spell the difference between progress and stagnation for the railroads.

Get Cost Information, for Control

There is not much point in railroads' calculating costs for the industry as a whole. The information would be more useful if computed regionally, or, better still, by individual railroads. If each railroad knew its own detailed costs, and would exchange such information with other railroads similarly situated, a great many opportunities for economies would be disclosed. Cost information is indispensable for effective rate-making; it is hardly less useful as a tool for effective control of expenses.

Stress Mass Production

All thriving large-scale industries owe their success to the application of mass-production principles (i.e., labor saving per unit of output). You can get a better automobile today for less money than you could in 1910—but a haircut costs six times as much. The railroads are strong in those aspects where mass-production economies are allowed to work, and they are weak in those areas where output per employee has not improved much. For example: Switching is a retail operation, while most road freight trains are mass-production. For the railroads to prosper as they should, they should minimize switching operations in relation to road movements—which is one of the best arguments there is for incentive rates, to induce heavy loading of cars and "trainload lots." One of the reasons passenger service is such a headache is that so little progress has been made in increasing passenger-miles per employee.

Measure Total Traffic

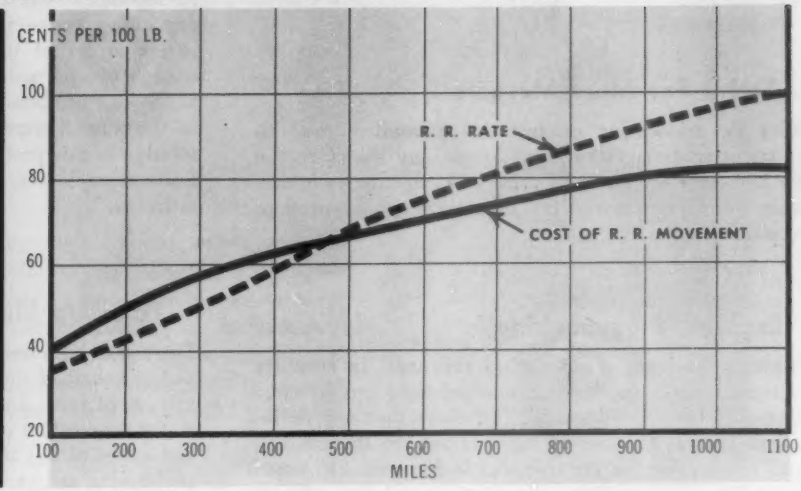
Few railroads know specifically what traffic they have lost. The ICC keeps detailed statistics on railroad traffic, but its figures on other agencies are incomplete—and there are no figures at all on traffic moved in shippers' own vehicles. In the national interest, as well as in that of the railroads, complete figures on all traffic moving should be made available. Such figures can be obtained by skilled sampling—and would probably be gathered by some official government agency, possibly the Census Bureau, if sufficient concern were shown by interested parties.

Find a Consistent "PR" Theme

There is a common denominator underlying every single legislative or regulatory objective for which the railways have been striving. In opposing the St. Lawrence Seaway, in supporting (in some states) ton-mile fees for highway use by heavy trucks, in seeking greater freedom in rate-making, in supporting toll charges for the use of the inland waterways, in endeavoring to get the right for railroads to engage in other forms of transportation, in seeking authority to abandon profitless services, in asking for the repeal of the long-and-short-haul clause—in all of these varied objectives there is an underlying common denominator. This common denominator is *opposition to socialism, defense of private enterprise and market freedom, and keeping the nation's*

(C) SOME RATES ARE IMPROVIDENTLY LOW

All profitless rates should go up, at least to level of out-of-pocket costs



total transportation bill as low as possible. If this common denominator were emphasized every time railroads pursue a specific objective, then the favorable public opinion achieved for one objective would automatically be transferred to other objectives having the same common denominator.

Rationalize Car Supply

Economic analysis covers other fields than skillful pricing, and equitable regulation and taxation. It also embraces such questions as "own or lease," "buy or build," the most profitable allocation of scarce supplies of capital, and a host of kindred problems. The perennial difficulty of a sufficient supply of freight cars, adequate to the lading they are to carry, could be resolved with relative ease by the judicious application of economic incentives where they do not now exist.

Merchandise and Promote

Economic studies graduate by easy stages into studies of markets, sales methods and "promotion"—none of them highly developed on the railroads, but all of them yielding attractive returns in other industries. "Promotion" embraces all the activities which help salesmen to increase their sales—and includes (1) providing salesmen with sales "ammunition"; (2) advertising; and (3) the kind of publicity which increases sales (as distinguished from that aimed at some other objective, such as favorable legislation).

Offer "Department Store" Service

The railroads in recent years have had relatively little to say about the restrictions which prevent them from engaging freely in other forms of transportation. Yet wherever they have been able to offer such services, they have done a good job (e.g., in bus and truck operation, and one railroad with a pipeline). There is every good reason in the public interest why railroads should continue to publicize the sound reasons which exist for permitting them to offer other types of transportation service, and for repealing the "commodity clause."

Explore New Capital Problem

Inflationary increases in costs are concealing the fact, when balance sheets are examined, that a lot of railroad installations are vanishing. A balance sheet item of $100 million of investment in plant and equipment today represents a lot less property than the same investment represented 25 years ago. To replace worn out property, most railroads have to finance that part not covered by depreciation charges by reinvestment of net earnings. With a lot of new money thus being required—not only for improvements but merely to keep existing property intact—it is no wonder that a lot of railroad plant has shriveled and is disappearing. The whole problem of adequate financing of replacements and improvements needs intensified study, to discover more effective methods for dealing with it. The situation also needs widespread publicity.

Rationalize Passenger Service

Passenger train service produced $1,148 million of revenue in 1955. This is "big business," by any standard of measurement. It is also a sick business because—while ICC figures on the extent of the losses are unacceptable—there's no doubt that, on most railroads, there is an actual deficit. It is easy to say that the solution must lie in increasing and improving the profitable services and in eliminating the unprofitable ones. But that solution can come only through extensive and intensive research, which is relatively inexpensive today because

of improved methods of compiling and classifying voluminous data.

Strive For More Mergers

With the widespread existence of alternative methods of transportation, there is no longer any sound reason for insistence on parallel service by competing railroads, when joint or consolidated operations would produce economies.

Exploit "Piggybacking"

Highway haulage is superior to railroads' in economy of terminal movement, while railroad costs are far more economical for the line-haul. It follows that any device which permits the use of highway service in terminals and rail service for the line-haul is economically sound —provided the savings are not dissipated by excessive cost of interchange between rail and highway, and by excessive tare weight. Mechanical ingenuity, if adequately encouraged, can solve the problems of interchange cost and excessive tare weight—and rate incentives, to give effect to these economies, can greatly extend the use of joint rail and highway transportation, to the advantage both of the agencies and patrons as well.

Keep After "Head End" and LCL

The railroads have striven mightily to retain mail traffic and to get paid remunerative rates for handling it. Beyond question, these efforts should be continued and intensified. The railroads owe no part of the shipping public a duty to haul their package freight at less than cost, but they do owe the duty to reduce this cost as much as possible—primarily by ingenuity in converting retail quantities into quantities suitable for the labor-saving of mass handling.

Protect Quality of Personnel

Most large industries, including some railroads, are using systematic methods of "screening" prospective employees —to secure the highest available quality of personnel. Such endeavor should be extended and intensified—along with systematic educational programs to improve the quality and quantity of individual performance. To judge by the advertisements in the daily press, most large industries are making far more strenuous efforts to recruit trained engineers and other technicians than the railroads are.

Study Labor Problems

One of the greatest difficulties railroads suffer in adapting themselves to a rapidly changing environment is the fact that railroad unions are craft unions—not primarily concerned with the welfare of employees as a whole, but only with that of a particular craft. Equating a "day" to 100 miles is certainly an anachronism with present-day high speeds—and restricting work of certain kinds to employees of particular crafts, when there is not enough of such work to keep them busy—are examples of the kind of obstacles which traditional unionism places in the way of maximum railroad efficiency. A realistic solution to this problem is as necessary in the interest of railroad employees, as in that of anybody else around the railroads.

Take Up Slack in Research

There is a lot more technological research going on, by and in behalf of the railroads, than the industry usually gets credit for. Individual railroads are doing some of it, the Association of American Railroads is doing a lot, and (most of all) the manufacturers of products used in performing railroad service are carrying it on. In many areas, however, suppliers have not had sufficient economic incentives to induce them to develop optimum equipment and methods. What the railroads need, therefore, is not to duplicate or take over research work that is already being adequately done in their behalf—but to observe closely at all times the whole range of research potential and to fill in for themselves any niches where there is doubt as to the quality of the work already being done.

Intensify Management Development

Many railroads in recent years have made great strides in the provision of educational opportunities for their management and supervisory people. As yet, however, it would not be possible to say that the railroads as an industry have gone nearly as far in this direction as other progressive industries of comparable size. Management is the least expensive purchase the railroads make (only 1.57 per cent of operating revenues in 1955). It is also the most important expenditure they make—because increased outlays to effect an improvement of only a few percentage points in the quality and skill of management performance would carry down millions more to net income.

Take Time for Industry Leadership

The most troublesome problems which confront the railroads lie in the field of industry policy. There is little that one company, acting in isolation, can do to solve most of these problems. The heads of most railroads are so busy with the problems of their own companies that insufficient time remains for most of them to dwell at length upon the great issues of industry policy. Yet the right answers to major problems of industry policy are just as important to the welfare of the individual railroad's stockholders as is the sound management of that road's own business. Strengthening of staffs, in order to allow more management time for problems of industry policy, should be a profitable forward step.

Is This *Real* Competition?

By BURTON N. BEHLING
Economist, Bureau of Railway Economics
Association of American Railroads

The essential starting point in appraising the competitive status of the nation's railroads is a recognition of their inherent economy as providers of general common carrier transportation service in large volumes. Moreover, by the continuing application of technological improvements in railroad fixed plant, equipment and operations, it is possible for the basic economy of railroad transportation to become progressively greater—if the necessary funds for capital investment are available.

Railroads Need Large Volume to Cut Costs for the Public ...

But it is also true that realization of the potential economy that is inherent in transportation by railroad requires an adequate volume of traffic over which to spread the relatively large fixed costs that are characteristic of this means of transportation. Unless this fundamental fact is kept in view the severely competitive problems besetting the railroads are likely to be misunderstood.

While these observations may seem elementary, it is unfortunately true that they are often given inadequate attention in public policies affecting the competitive situation of the railroads. Conditions that restrict traffic volumes and bring about an underutilization of rail facilities result in higher unit costs of railroad service than would otherwise be attainable, and such higher costs as reflected in rates make it more difficult to attract or hold the traffic volumes that make low-cost rail transportation possible.

Yet, they are losing their share of traffic. Considering the inherent economy of railroad transportation it would seem that the competitive position of the railroads should be strong. Yet it is evident that at no time in their history have the railroads been confronted with such intense competition from other forms of transportation as they now are.

Their share of intercity freight traffic has been steadily declining in recent years, while growing proportions of traffic have moved by highway and inland waterway. By 1954 the railroads carried but 65% of the total traffic by rail, highway and barge—compared with almost 85% in 1946. These comparisons with the railroads' principal competitors do not include the highly specialized pipelines or carriers on the Great Lakes, nor air lines (still a small factor in the transportation of freight). In the commercial transportation of persons the railroads have had even greater relative traffic declines, particularly as compared with air lines.

Question: Is the Trend Due to Obsolescence?

It is true, of course, that each form of transportation has certain advantages that enable it to do some things better than the others. For example: the air lines have extraordinary speed; trucks provide flexible door-to-door service — often with time savings—particularly on shorter hauls; and transportation on natural waterways available at no cost to *anyone* for their improvement may, in some circumstances, be truly low-cost transportation.

If trends against the railroads were merely the natural consequence of competitive forces, it could be concluded that the results reflect a dem-

(Continued on next page)

Dr. Burton Neubert Behling, a graduate of the University of Illinois, is one of that growing body of economists, both inside and outside the transportation field, who recognize clearly the handicaps imposed upon the railroads in their competitive struggle.

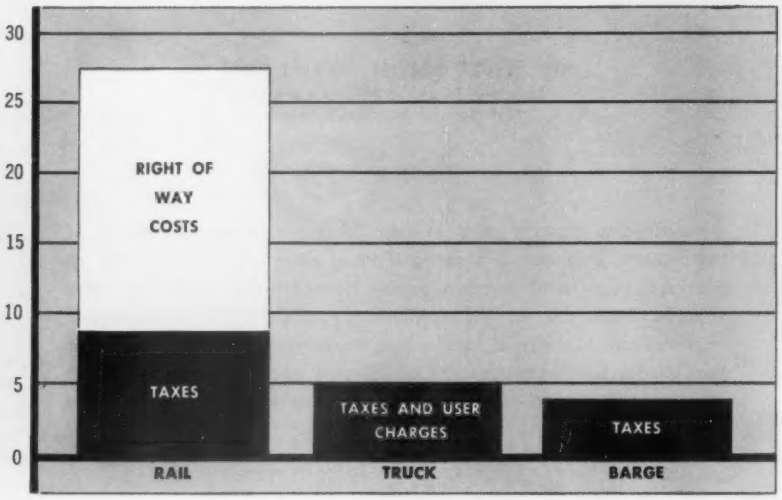
Becoming keenly interested in transportation problems during 7 years as a member of the faculty of the Department of Economics, University of Illinois, the author joined the Interstate Commerce Commission as economic analyst. In 1941, after three years with the commission, he was appointed director of public aids investigation, Board of Investigation & Research. In 1944-48, he served as special assistant to the Federal Power Commission and in 1948-49 he was economic consultant for the National Security Resources Board.

In 1949, he became senior specialist in transportation, Library of Congress, in which position he gained national renown as a compiler of facts, an interpreter and an inspirer of discussion of transportation regulation and taxation. In 1954 he came to the AAR as economist, Bureau of Railway Economics.

Among other studies, he is the author of "Competition and Monopoly in Public Utility Industries" (1938); "Railroad Coordination & Consolidation—a Review of Estimated Economies" (1940); and "Public Aids to Domestic Transportation" (submitted to the 79th Congress in 1944).

OUTLAYS AS PERCENT OF GROSS OPERATING REVENUES 1953

Railroads pay more for taxes and route than their rivals



onstrated economic superiority of other types of carriers over the railroads. In short, the railroads could be classed as probable candidates for the fate of the oxcart and the pony express. This would be in accordance with the normal functioning of the competitive enterprise system which underpins the development and vigor of our national economy.

However, the normal workings of a competitive system do not explain the declining share of total traffic obtained by the railroads. The real problems today of competitive transportation are not the natural outcome of a selective process by which buyers of transportation evaluate cost and service factors on the basis of relative overall suitability. It is obvious that the railroads do *not* have equal competitive opportunity to demonstrate their real cost economy and their comparative service capabilities.

Railroads Pay Their Own Way; Rivals Use Public Property

As self-supporting business enterprises, the railroads bear all of their transportation costs, but their competitors do not. The highway transporters, the inland waterway operators and the air lines conduct their business—with none of the risks of ownership—on public facilities built and maintained with public funds. The railroads, on the other hand, provide and maintain their own right-of-way facilities, on which they also pay taxes.

Although some of their competitors are required to pay user charges covering *part* of the costs of the public facilities on which they operate, none of these charges includes any allowance for property taxes. There are other obvious inadequacies. Heavy commercial vehicles operating on the public highways are not required to pay according to their relative use the costs of their extraordinary highway requirements, and their extreme absorption of highway capacity.

While commercial air lines pay certain rental and landing fees to the local sponsors of public airports, they do not purport to cover the full costs attributable to the air lines, and nothing is paid as compensation for federal expenditures in aid to airport developments or in providing the elaborate and costly system of air navigation facilities. Operators on inland waterways improved and maintained by the government at the expense of general taxpayers still pay *nothing whatever* toward the costs of constructing and maintaining such facilities.

The railroads pay taxes in support of general government functions and for which they receive no special benefits in return. Their competitors pay taxes, too, but they are largely or wholly offset by direct benefits received in operating on basic facilities provided for their use. Until they discharge *both* of their obligations to make fully compensatory payments for the use of public facilities and to contribute a proper share of general taxes, they will continue to have an artificial competitive advantage over the railroads and patterns of traffic distribution will not conform with true relative economy of cost and service.

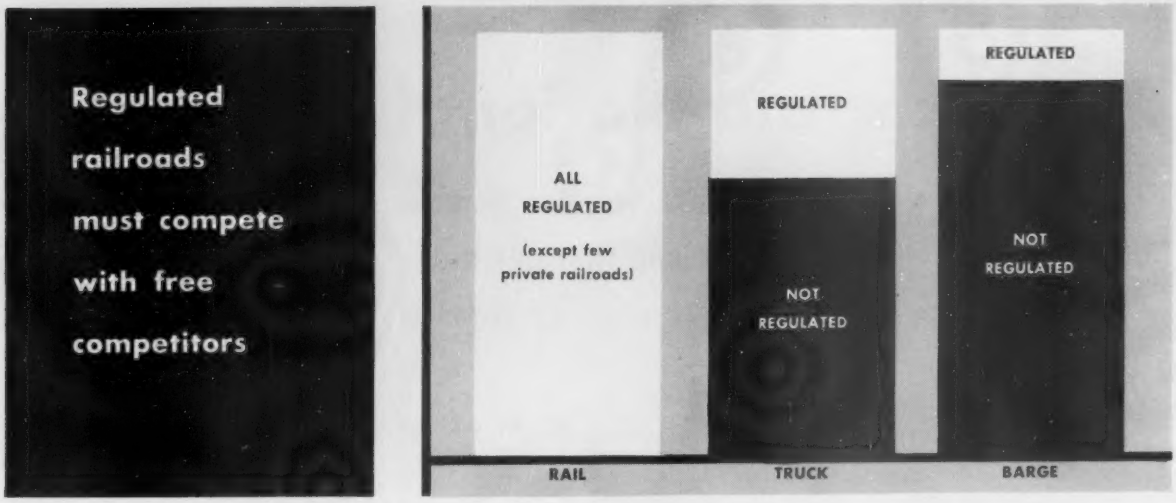
It is significent in this connection that the railroads pay in general taxes a greater percentage of their operating revenues than do the motor freight carriers in general taxes and user charge payments combined.

Data reported by the different types of carriers to the Interstate Commerce Commission and the Civil Aeronautics Board reveal that the comparative percentages of all taxes (except payroll taxes and for the air lines their fees and rentals* to local sponsors of airports) to total operating revenues were as follows in 1953:

Class I railroads	8.4
Class I (intercity) motor common carriers of general freight	5.6
Class A and B water carriers	4.8
Domestic scheduled air lines	7.1

*Data not available.

RATIO OF TRAFFIC MOVING UNDER REGULATION



Get Nothing Back; Maintain Routes Themselves

Still another tax handicap affecting the railroads as common carriers is the continued imposition of the war-emergency federal excise taxes on transportation for hire, which those engaged in private transportation do not pay.

In addition to these greater tax burdens the railroads, unlike their competitors, bear all of the costs of providing and maintaining their own right-of-way facilities. In 1953 these costs amounted to over 20 per cent of total railroad operating revenues. Other forms of transportation that operate on public facilities escape such right-of-way costs—except insofar as they are required to pay user charges as compensation.

The taxes and right-of-way costs paid by the railroads are thus a far greater proportion of their operating revenues than are the general taxes and user charges paid by truckers and the taxes paid by barge operators on the inland waterways.

In providing the only complete common-carrier type of regulated transportation, the railroads also have service obligations which most of their competitors do not have. The specialized forms of transportation are free to select the transportation operations they will undertake to perform and are likewise relatively free to adjust the extent, frequency and regularity of their services.

The railroads' competitors are able to avoid costs which the performance of dependable common-carrier service necessarily involves. The railroads are in no such position to pick and choose, with the result that their general common-carrier service has to no small extent tended to become synonymous with the provision of a residual, stand-by service not supplied by others. It was a recognition of these circumstances and of the basic essentiality of common-carrier transportation to both the nation's peacetime economy and the national security which led the Presidential Advisory Committee on Transport Policy to warn:

> "Historically, common carrier service has been recognized as the hard core of our transportation system. Yet, in recent years there have been a number of developments that have mitigated against the maintenance of a financially strong system of common carrier transportation."

It is a competitive handicap of the railroads that they are regulated much more completely than most of their competitors, many of which as exempt or private, and pseudo-private, operators are not regulated at all in the pricing of their services. As shown in the accompanying chart, less than one-third of intercity freight transportation on the highways and only about 10 per cent of commercial transportation on the inland waterways is subject to Interstate Commerce Commission regulation. Stated another way, of all the intercity traffic that *is* regulated, approximately 88 per cent is railroad traffic.

The Exclusive Chains of Regulation

The competitive consequences of this situation are especially serious for the railroads when regulation is made unduly restrictive. In numerous instances the railroads have been forbidden to reduce their rates on competitive traffic, even though such rates would be more than compensatory. The reason: other types of carriers might be deprived of a "fair share" of the total traffic. The pernicious result of this "fair share" doctrine is to hold a protective umbrella over the subsidized and large-

(Continued on page 180)

A LOOK AHEAD AT . . .

Railroads and National Defense

- Atomic warfare will not decrease need for rail transport
- The side that can first get back on its feet will win
- Railroads have great powers of "recuperation"

General Van Fleet in Korea, where he commanded the U.S. Eighth Army between April 1951 and February 1953.

By GENERAL JAMES A. VAN FLEET
U. S. Army (Ret.)

"The railroads of the United States are a great basic military asset. They are as much a part of the military strength of the nation as our Army, Navy, Air Force, and Marines, because none of these great armed services could long operate without the logistical support which railroads provide. No other form of transport, nor all other forms of transport combined, could take over the job of railroads, because they all lack some of the inherent characteristics on which the military value of railroads is based."

This statement—appearing in my booklet, "Rail Transport and the Winning of Wars" (published and distributed earlier this year by the Association of American Railroads)—was based upon both personal observation and recorded experience of the effect of rail transport, or the lack thereof, on the outcome of campaigns and the winning of wars up to, and including, the Korean episode.

In my opinion, it will apply no less, and perhaps even more, in any future national emergency. And I say this in full appreciation of the radically changed concepts of war and defense inspired by the rapid postwar developments in nuclear fission and jet propulsion.

In that connection, I subscribe fully to the views of Maj. Gen. Charles G. Holle, the Army's deputy chief of engineers for construction, as expressed in the following excerpts from his address of March 13, 1956. Referring to the "vast scope and variety of service demanded by the armed forces in meeting the logistic requirements of wartime," General Holle said:

"The changes in military planning brought about by the nuclear age will in no wise diminish the need for such services and may well increase them. The tides of battle may shift with greater rapidity about the globe, requiring more movement and transport."

General Holle's comments with respect to the role of railroads in "the little-considered matter of survival power," are especially significant and to the point:

"After two nations have struck intitial atomic blows at one another, it is the side that can first get to its feet to deliver a second blow which has the advantage, and the one that can keep on standing and fighting longest which will ultimately win.

The part which railways play in this ability to survive and fight back was demonstrated in World War II."

General Holle added:

"Fully as vital as relative armaments are the relative capacities of the two great powers to reorganize and rebuild, shift and substitute, and swiftly transfer focuses of effort from stricken areas to those more capable of carrying on the struggle. In other words, I believe that flexibility and mobility—construction power and transportation power—are absolutely vital factors in national survival—more so in this atomic age than ever before.

"Thus the close bond of interest that has always linked the Army, including the Army Engineers, with the national railway industry is stronger today than ever."

Other characteristics of railroads which would be of vital importance in the event of atomic war are their powers of durability and recuperability—their resistance to disabling damage or destruction, and their ability to make a quick recovery. Significantly, General Holle observed that "even under the atom bombs which fell on Hiroshima and Nagasaki, railroad-type structures stood up among the best."

This finding was supported by Maj. Gen. Frank S. Besson, Jr., assistant chief of staff logistics, Supreme Headquarters Allied Powers in Europe, and deputy chief of transportation, Armed Forces, Western Pacific, during World War II, in an article for the National Defense Transportation Journal of March-April, 1956. Saying that railroads and highways are difficult to attack with atomic bombs, General Besson observed that "the relatively minor effect of atomic bombing on a railroad is indicated by the fact that regular rail service was resumed through Hiroshima within 18 hours after the first atomic bomb dropped on that city."

These comments by men directly concerned with transportation and logistics refer especially to the role of railroads in the event of an *atomic* war. This nation must be prepared to deter or fight an atomic war, of course. But we must be at least equally prepared to deter, or fight, a war with conventional weapons and by conventional means.

The part which railroads will play in any future war, atomic or conventional, will be no different than the part they have always played since railroads became an important military factor.

If the war is fought *beyond* our shores, railroads, as always, will support and make possible the huge national productive effort required, and will provide the high-volume, long-haul, dependable transport to get the men and tools of war to training camps and ports as needed. They will supply men and officers for our military railway units. And they will be called upon once again to handle the great bulk of the increased civilian requirements for transportation of all kinds that is an inevitable part of a military effort.

If War Comes at Home

If war should come to our own shores—as it almost certainly would—the role of railroads will be just as vital. High-volume, heavy-duty transport would be required to get troops and supplies to threatened areas at a moment's notice, and of all forms of transportation, railroads are best organized to do that job. Railroads might also be called upon for tactical movements direct to the battlefield, such as those they made at Pusan and during the Battle of the Bulge. In such an event, the intricate rail network of alternate routes and long-standing arrangements for rerouting might well be our national salvation.

This nation's military strength today, as always, involves ground forces and all their gear. It therefore involves moving men about, moving large quantities of war goods and even larger quantities of the raw materials and resources needed in the production of those goods.

In a word, it involves railroads. For railroads remain the mode of transport capable of meeting the greatest part of the military traffic requirements, whatever the nature of our military effort.

Absorptive Power . . .

. . . is key to the railroads' wartime strength

This World War II solid "symbol" train of oil on the Boston & Albany (NYC) carrying petroleum to the eastern seaboard is one dramatic proof of that power. Normally the railroads do not handle this traffic. Yet, when enemy sinkings forced tanker movements off the seas, the railroads took over the load without additional motive power and with but negligible additions to the tank car fleet. From practically zero in December 1941, rail movement reached more than a million barrels a day by July 1943.

In the peak World War II traffic year of 1944 the railroads increased their production of freight transportation 97% over peacetime 1940—with only 7% more freight cars and 4% more units of motive power. The production by other forms of transportation actually declined during this period.

TRAFFIC IN THE NEXT TEN YEARS

(Continued from page 162)

constructed, along with better signals and heavier rails.

Various combinations of rail and truck services are developing rapidly. At the end of 1955, 34 major railroads were offering a truck or trailer-on-flat-cars, or "piggyback," service.

Most of the companies engaged in these piggyback operations handled only their own or private trailers. Only seven offered to transport common carrier trailers, but the practice was growing. According to F. B. Whitman, president of the Western Pacific, "there are two problems in connection with developing a volume of T-O-F-C business on this basis:

"(1) Transit time must be comparable with truck service, and

"(2) The service must be made attractive enough both timewise and pricewise to persuade a shipper who has been using truck service to come back to the rails."

There are, of course, disagreements as to how these goals can best be reached. Some rail experts believe that metal containers (demountable truck or trailer bodies) will, in time, supersede the handling of trailers on flat cars. The advantages cited are less tare weight, greater ease of fastening, and improved interchangeability once standards are established. Indeed, these and other technological problems, and uncertainty as to the direction they are apt to take, had led some railroads to postpone the establishment of piggyback, removable container, or railvan service.

This condition of underdevelopment, of course, means that piggyback service will grow.

Some railroad officers are enthusiastic about the chance offered by piggyback service to regain private motor carrier loads. As a matter of fact, Armour & Co., one of the nation's major meat packers, has instituted such a service with both the Texas & Pacific and the Union Pacific. The packing company has found that piggyback reduces loading and unloading work, cuts wear on motor vehicles and results in the delivery of its products in better condition.

Traffic which previously had moved only by highway is now moving also by rail. Here, as in other situations, the railroads must capitalize more fully on their advantages as mass carriers of freight, reflecting through their freight rates their inherent cost advantages.

T-O-F-C Problems

There are some important obstacles still in the way of T-O-F-C. Even the most enthusiastic piggybackers are unhappy about the costs of loading and unloading trailers on flat cars. In attempts to reduce these costs some railroads are experimenting with new types of "circus loading" equipment; and if their expectations are realized, costs will be reduced by more than 50%.

Another development of significance to the railroads is the development of "fishyback" service in both coastal and foreign services. It is of two kinds. One comprises specially built "roll-on, roll-off" vessels equipped to handle truck-trailers on special containers. The other is a development utilizing tankers. Tankers which ordinarily would make return trips under ballast are beginning to carry payloads in metal containers. At present, this competitive service is only offered to the points at which the tankers reload with petroleum products. But it is a very low cost, highly profitable business for the tankers and is likely to increase.

In one sense, fishyback will prove helpful to the railroads by cutting ship-rail transfer costs—if the roads provide the mobile equipment required. In another, where it runs in domestic water service competitive with local rail routes, it will introduce new lost cost competition.

While the above analysis is essentially optimistic for the railroads, it does not allow for complacency by management. **There are still formidable problems to be solved, and complacency will assure that they are not met.** Furthermore, progress will be slow—disappointingly so at times. Consequently, we believe that the competitive position of the railroads is not apt to improve by more than three to four per cent of total intercity ton-miles during the next ten years. And growth of one-half per cent in any one year is apt to be achieved only by substantial effort.

IS THIS COMPETITION?

(Continued from page 177)

ly unregulated competitors of the railroads and to deny the railroads opportunities for traffic volumes that would reduce their costs for the benefit of shippers and the public generally.

Regulation according to a "fair share" concept thus contains a built-in bias favoring unregulated transportation which it cannot reach, as against the regulated common carriers upon which this restrictive doctrine is imposed.

This can hardly be the way to preserve a strong system of common carrier transportation to serve the nation's commerce and to safeguard the national security. Competitive realities in present-day transportation require a greater freedom in rate-making for the essential common carriers—and particularly for the self-supporting railroads with their low-cost potential through large traffic volume—to price their services in accordance with their own cost conditions so as to attract and hold, and not to repel, competitive traffic.

In this way lies progress for the nation's railroads—with greater traffic and earnings as the necessary basis for capital formation to finance modernizations and technological improvements of plant and equipment in many respects. Given opportunity to compete on more equal terms with other forms of transportation, with all costs considered and without harmfully restrictive regulation, the railroads will then be enabled to demonstrate more fully their inherent potential of low-cost transportation.

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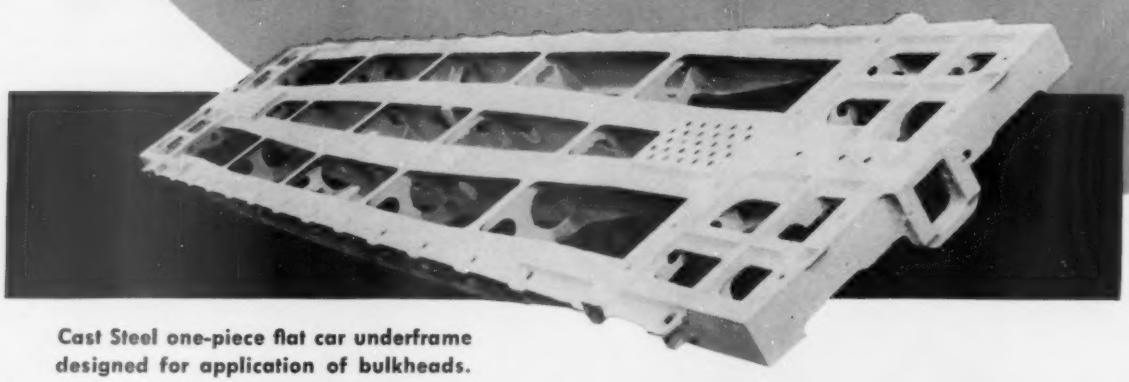

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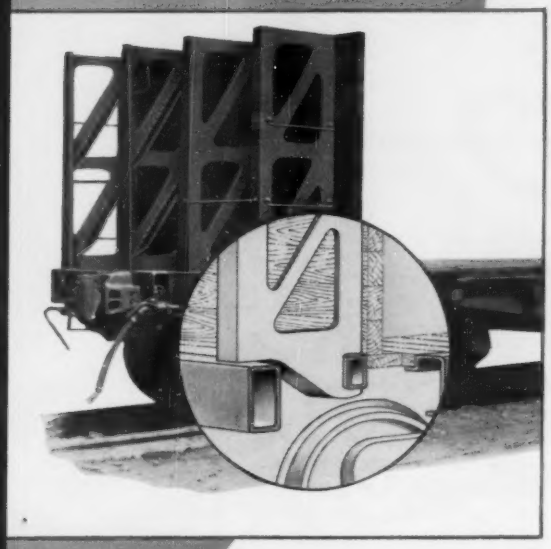

Illustrating application of interlocking cast steel bulkheads . . . quickly done at low cost.

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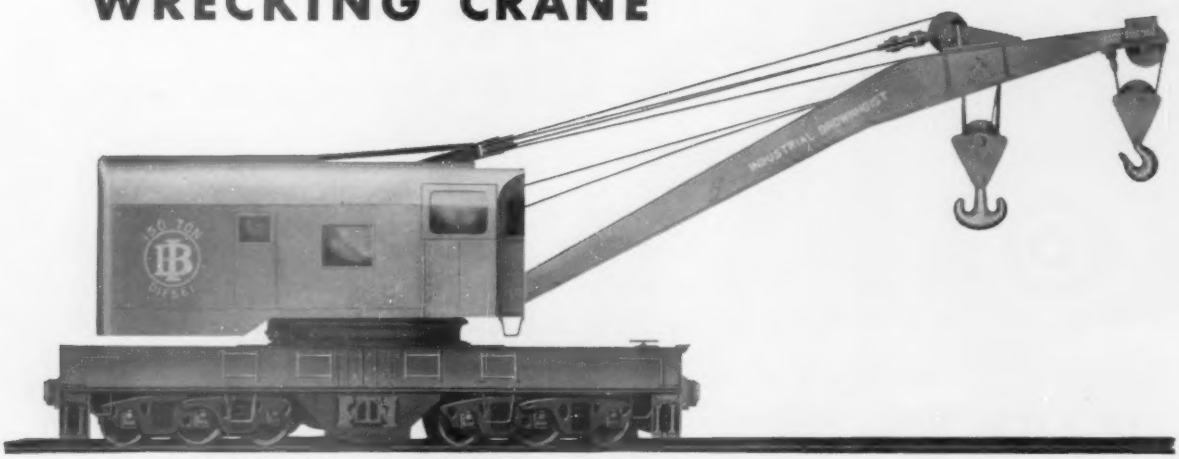

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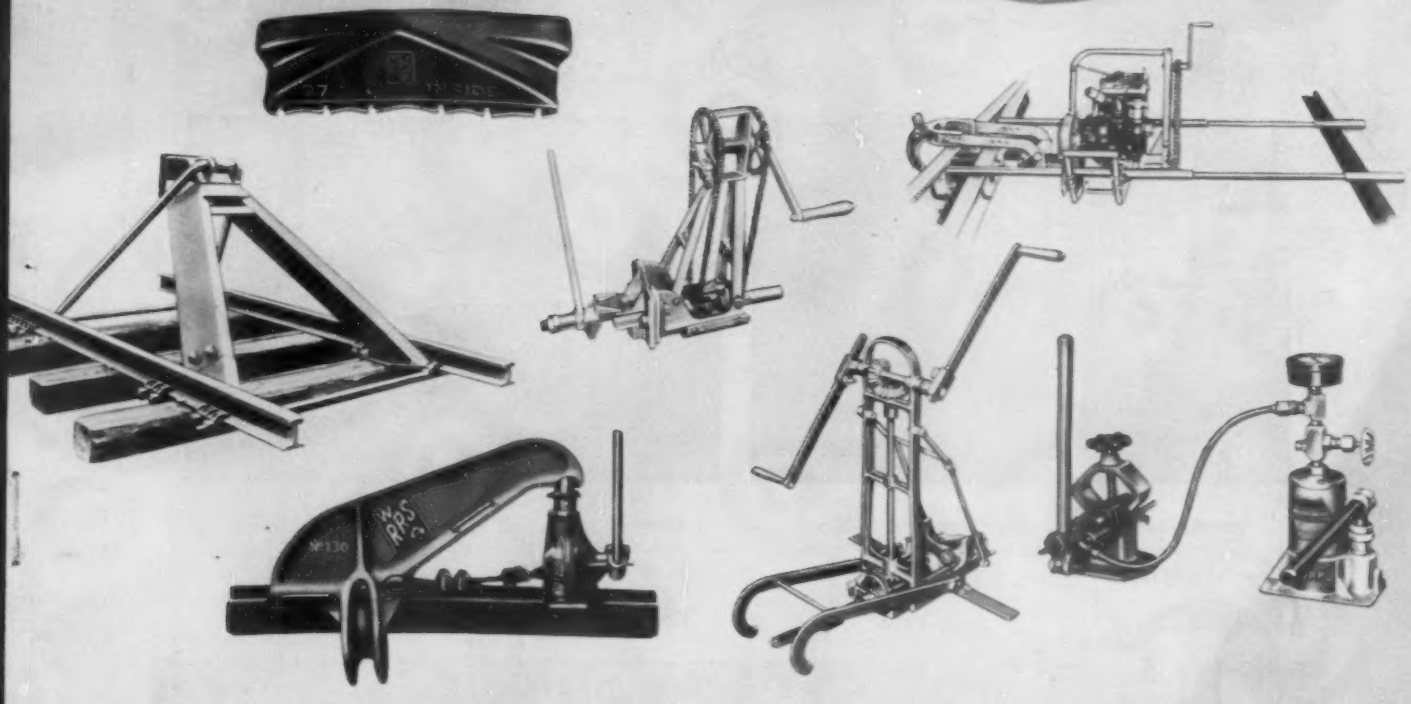

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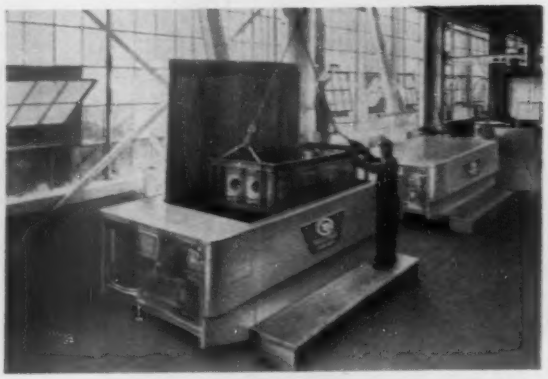

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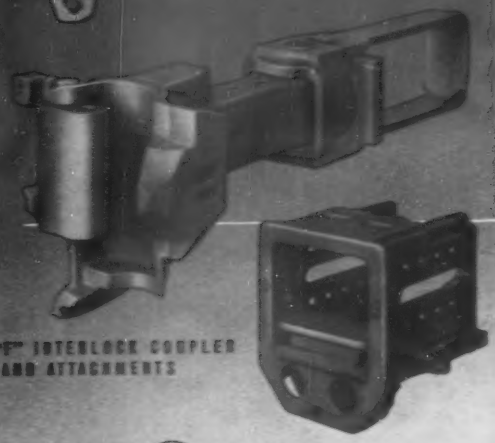

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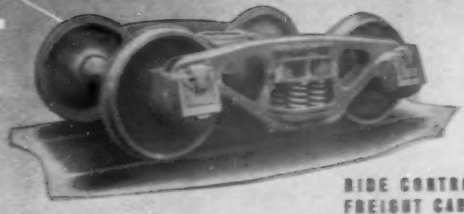

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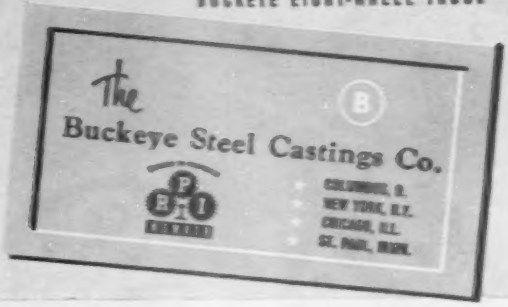

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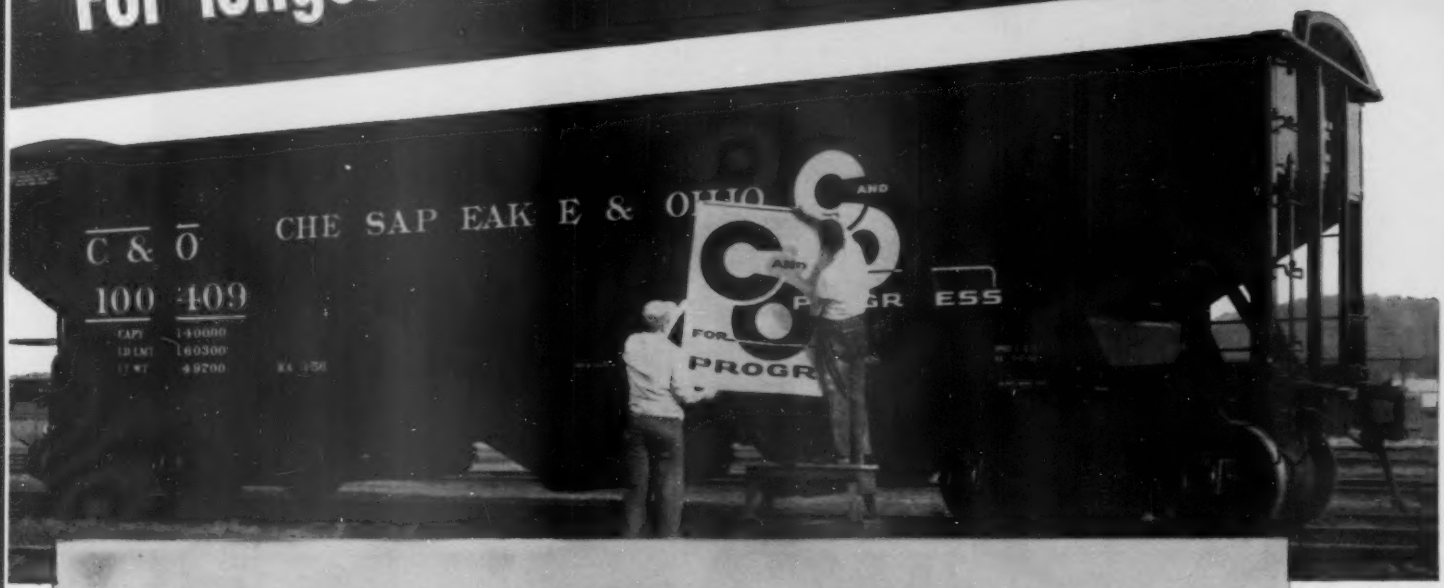
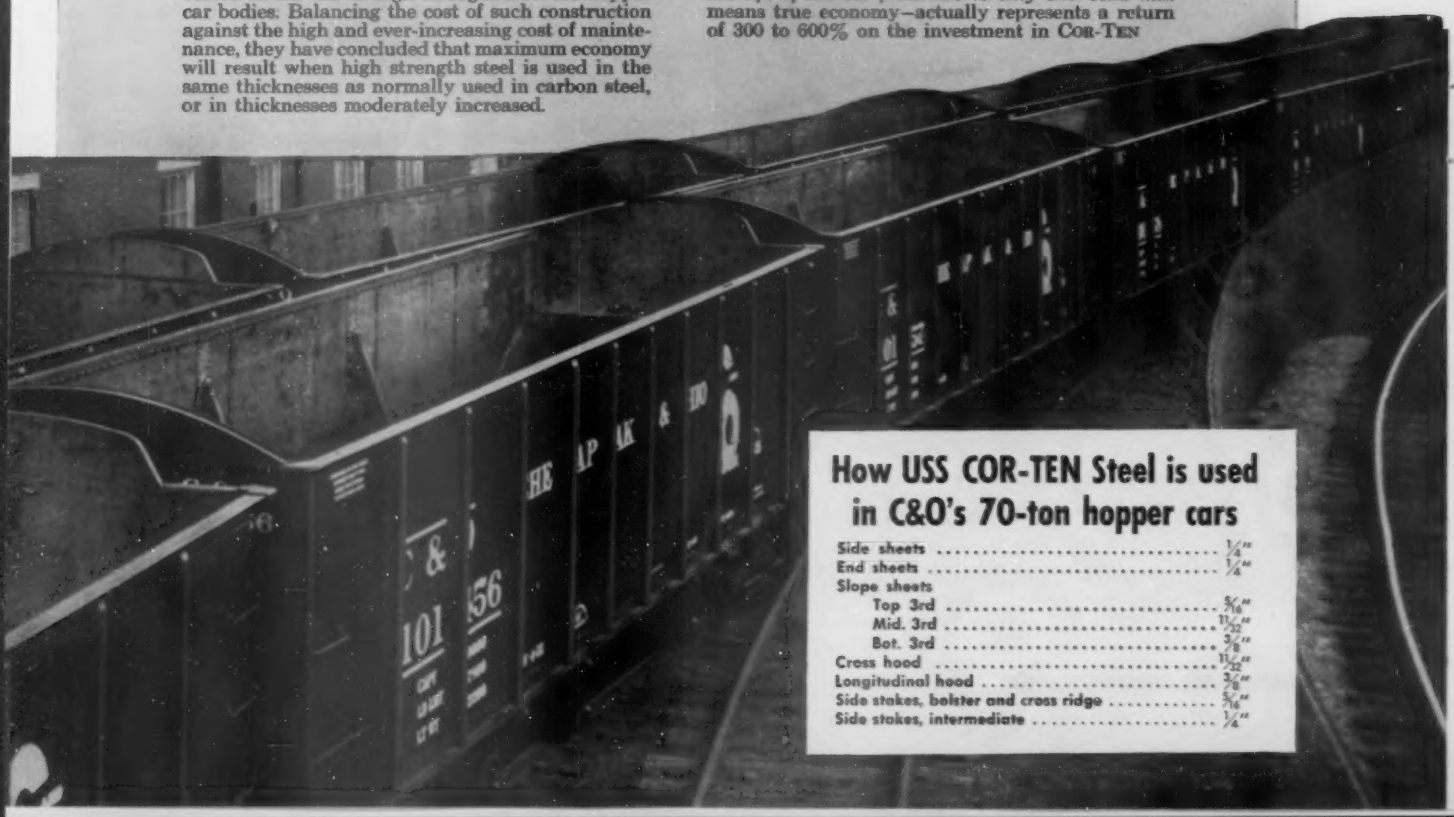


Why it pays to use USS COR-TEN steel in hopper car bodies

Today, hopper cars are being subjected to mechanical damage as never before. What's more, the cost of maintenance has skyrocketed. As a result, the emphasis now is on *durability*.

With present operating conditions in mind, several leading railroads—the C&O among them—have carefully analyzed the economic factors involved in the use of high strength steel for hopper car bodies. Balancing the cost of such construction against the high and ever-increasing cost of maintenance, they have concluded that maximum economy will result when high strength steel is used in the same thicknesses as normally used in carbon steel, or in thicknesses moderately increased.

Because of its superior strength and higher atmospheric corrosion resistance, construction with USS COR-TEN Steel will provide the needed *extra* resistance to mechanically imposed damage, to impact in loading and to corrosive deterioration. By assuring up to 50% longer life in the body structure, *it will reduce the number of replacements during the life of the car from two to only one.* And that means true economy—actually represents a return of 300 to 600% on the investment in COR-TEN



How USS COR-TEN Steel is used in C&O's 70-ton hopper cars

Side sheets	7/16"
End sheets	7/16"
Slope sheets	
Top 3rd	5/16"
Mid. 3rd	11/32"
Bot. 3rd	3/8"
Cross hood	11/32"
Longitudinal hood	3/8"
Side stakes, bolster and cross ridge	5/16"
Side stakes, intermediate	7/16"

specify construction with USS COR-TEN Steel

To extend car life—to avoid costly maintenance and repairs

Since 1950 Chesapeake & Ohio has standardized on high strength, low alloy steel for all its hopper cars

Every railroad officer concerned with the improvement in freight car efficiency can draw a lesson from the C&O car building and rehabilitation program. There are sound economic reasons why, in the past six years, high strength, low alloy steel has been specified by this railroad for the body sheets that come into contact with the lading of every new hopper car built or bought, or old cars repaired when the underframes had sufficient remaining life to justify replacement of body sheets.

With more than 52,000 hopper cars in operation, the C&O can be expected to know all there is to know about such equipment – in particular, it has every reason to be fully aware of the high cost of repairing corrosion and mechanical damage.

That is why in its 1950 Annual Report the C&O has this to say: *"After extensive research, a policy of using high strength, low alloy steel for major repair and construction of coal hopper cars was adopted by C&O. While increasing the cost of each car by $200, the better steel will add years to the service life of the coal car fleet. The long range effect on equipment maintenance cost will be significant."*

To date C&O has used high strength steel—principally USS COR-TEN—in 16,156 rebuilt and in 7,500 new hopper cars.

This decision to standardize on high strength steel construction was largely influenced by the good performance of USS COR-TEN Steel in ten lightweight hopper cars put into service in 1935. Although sides and ends were only ⅛" thick and bottoms 7/16" thick, these cars gave 14-odd years of service before major heavy repairs, as contrasted to 11 to 13 years' average service for cars built with copper steel sheets, 50% and 33% thicker.

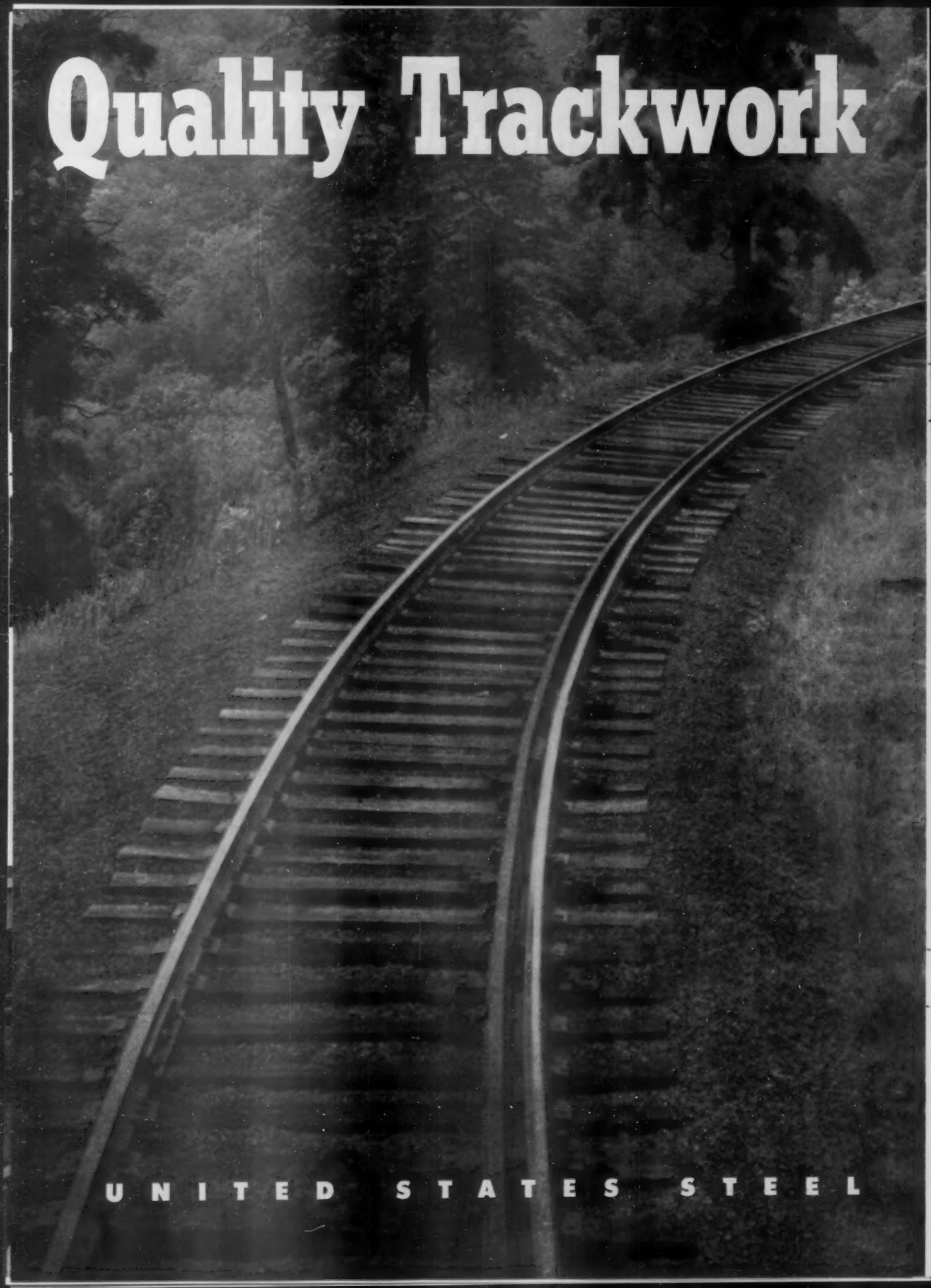
When you are considering new construction or the rebuilding of your present hopper cars, let us furnish you with figures on the comparative costs – and the anticipated savings—of USS COR-TEN Steel used in place of carbon steel body sheets.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

See "THE UNITED STATES STEEL HOUR"—Televised alternate weeks—Consult your newspaper for time and station.

UNITED STATES STEEL

Quality Trackwork



UNITED STATES STEEL

on the job by U. S. Steel

Over 200 USS Taylor Adjustable Rail Braces were installed on two of the sharpest, steepest curves of the Western Maryland Railway to prevent the inside rail from turning out or breaking under pressure of traffic, which it had been doing. Both curves, one of which is shown here, are in excess of 25 degrees, and both are on almost a three per cent grade, located approximately 70 miles west of Elkins, West Virginia.

Mr. S. W. George, Division Engineer of Elkins Division, shown examining one of the Taylor Rail Braces, says that this installation was made in an effort to eliminate the problem and to reduce maintenance on these two curves to an absolute minimum. So far, service has been very satisfactory.

The USS Taylor Adjustable Rail Brace is specifically designed to take the repeated thrust of heavy, fast traffic without loosening—maintaining track gage and alignment at all times. Quickly installed, it rarely needs adjustment, and gives long, rugged service at low cost.

All USS Quality Trackwork products possess an inherent strength that gives them longer life and results in greatly reduced maintenance. The extra care and effort that go into the manufacture of rail braces, switches, frogs and special track layouts make USS Quality Trackwork the finest you can buy. Specify USS Quality Trackwork for all your requirements.

For complete details on USS Trackwork, return the coupon. Also, you are invited to contact our engineers at any time for assistance in design.

USS

TRACKWORK

UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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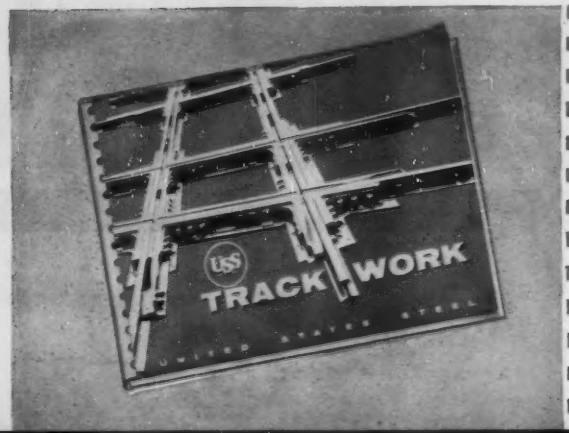

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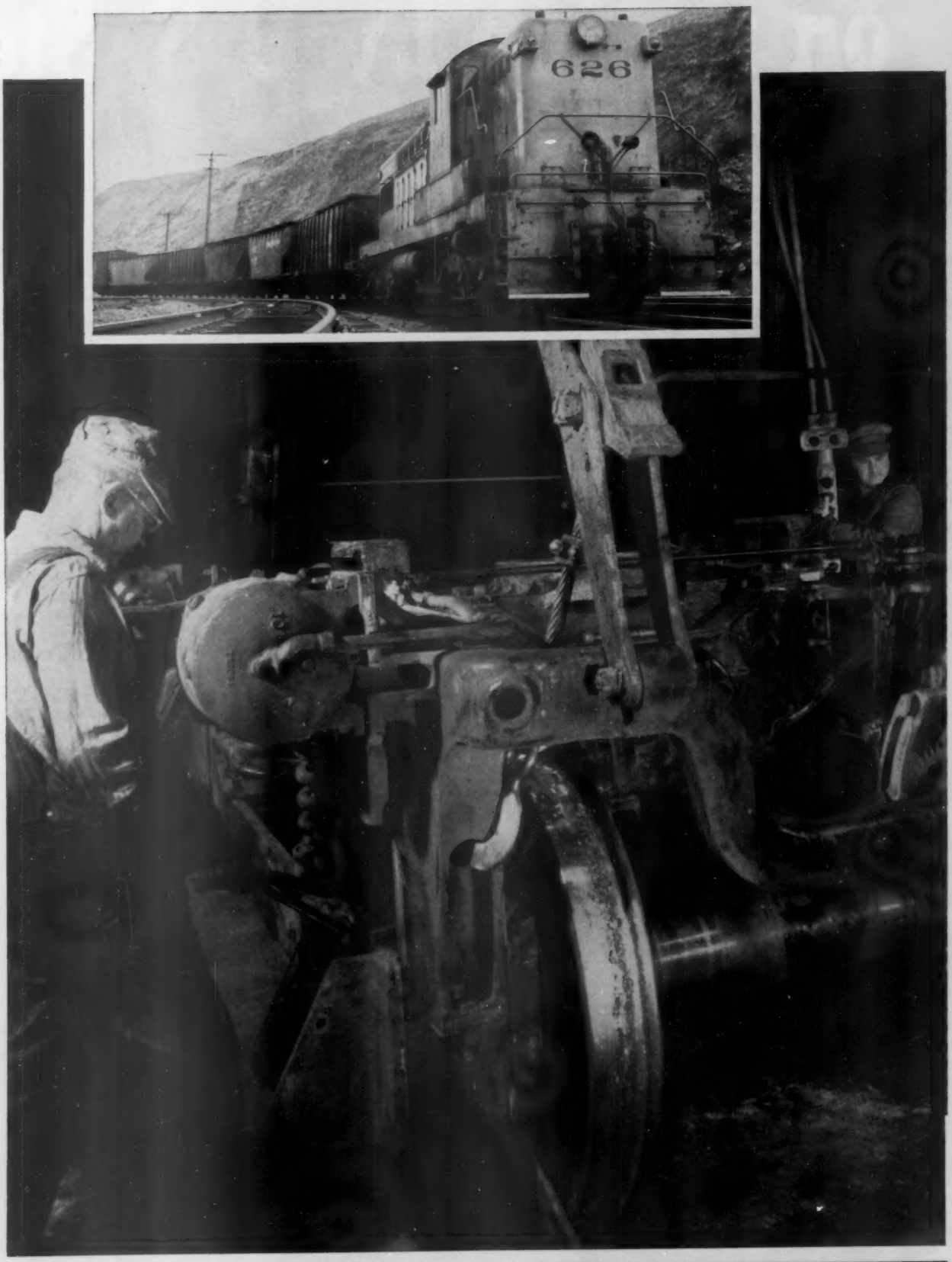
626
UNITED STATES STEEL

USS Multiple-Wear Wrought Steel Wheels

for long-range economy

That four-wheel diesel engine truck is being equipped with 40-inch diameter USS Multiple-Wear *Wrought* Steel Wheels—the wheel that gives the greatest amount of safe, dependable service under the most rigorous road conditions.

Multiple-Wear Wheels are becoming increasingly popular for freight service, too. And for good reason. More expensive, initially, than one-wear type wheels, they are actually more economical in the long run since they deliver more ton-miles than any other type wheel.

Here's how they do it. Basically, because they are made of steel, they possess the strength and toughness to bear heavy loads, the hardness to resist wear, and the ductility to minimize sudden brittle fractures. Secondly, this excellent combination of inherent properties is improved by forging, rolling, control-cooling and heat treating. The result is a wheel of unequalled soundness, well prepared for thousands of miles under heavy loads, severe braking and high speed impacts.

Remember USS Multiple Wear *Wrought* Steel Wheels—your best buy for all services—under diesel locomotives, electric and steam locomotives, passenger, express, and freight cars.

Two strategically located, complete wheel plants are ready to fill your orders for Wrought Steel Wheels: The McKees Rocks (Pittsburgh), Pennsylvania plant, serving the East and Southeast; and the Gary, Indiana plant, supplying the Western and Southwestern Lines.

SEE The United States Steel Hour. Televised alternate weeks. Consult your local newspaper for time and station.

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USS WROUGHT STEEL WHEELS

UNITED STATES STEEL

How a "Precious Metal" cuts costs for railroads

One hundred years ago, when the first copies of *Railway Age* were coming off the presses, aluminum was prized by kings as a precious metal, costing more than $500 a pound.

Look what has happened to aluminum today! Now costing 24¢ a pound, you see this light (⅓ the weight of steel or copper), strong, corrosion-resistant metal everywhere.

Today, in the railroad industry, more and more aluminum is evident . . . locomotive components, passenger trains, tank cars, cargo containers, roadway signs, crossbucks.

Aluminum's unique combination of useful properties—including lightness, strength, corrosion resistance, workability, economy—properly designed and engineered, saves railroads money and increases efficiency.

We are confident that the next century will see many new and imaginative uses of aluminum in the railroad industry. We'll be glad to work with you as an "idea partner," sharing with you our aluminum fabricating knowledge and engineering skill.

Call the Kaiser Aluminum sales office listed in your telephone directory. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office,* Palmolive Bldg., Chicago 11, Illinois; *Executive Office,* Kaiser Bldg., Oakland 12, California.

Kaiser Aluminum

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

Protect Railroad Grade Crossings with WRRS Model 10 Automatic Signals

They are the safest and most reliable signals made. Install them now to save lives. Save lives and you also save millions of dollars in claims.

Here's another vital consideration. Protect grade crossings and you make an economical investment in good public relations.

In addition, these automatic signals will save millions of dollars in wages. They already yield an annual return of 30-40% on a hundred railroads.

WRRS Model 10 Signals are good for safety and good for business.

WESTERN RAILROAD SUPPLY COMPANY
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MORE OF THE GARLOCK 2,000

how many hours has Garlock saved Your Railroad these past 69 years ?

Garlock replacement gaskets for diesel locomotives.

Garlock LATTICE BRAID* Rod Packing.

69 years ago, Garlock began serving the packing requirements of railroads in the United States and Canada. Through the years, Garlock representatives have constantly kept abreast of the changing needs of railroad people... helping to save valuable time and reduce your maintenance and replacement costs.

Garlock Molded Rubber Seal Rings.

For example: (1) From this long experience, better, longer lasting packing and gasketing materials have been developed. (2) Many hours of your time are regularly saved by Garlock's method of individually packaging and labeling replacement parts before shipment to you... the quantity and engine manufacturers' part number is clearly printed on each package. (3) To save you time in emergencies, Garlock diesel replacement parts are pre-stocked and packaged ready for immediate shipment from strategically located warehouses.

The proper replacement part for *every* diesel locomotive is included in "the famous Garlock 2,000"... two thousand different styles of packings, gaskets, and seals to meet all your needs... the *only* complete line. That's why you get unbiased recommendations from your Garlock representative. Call him, or write for complete diesel parts and price lists.

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THE GARLOCK PACKING COMPANY, Palmyra, New York

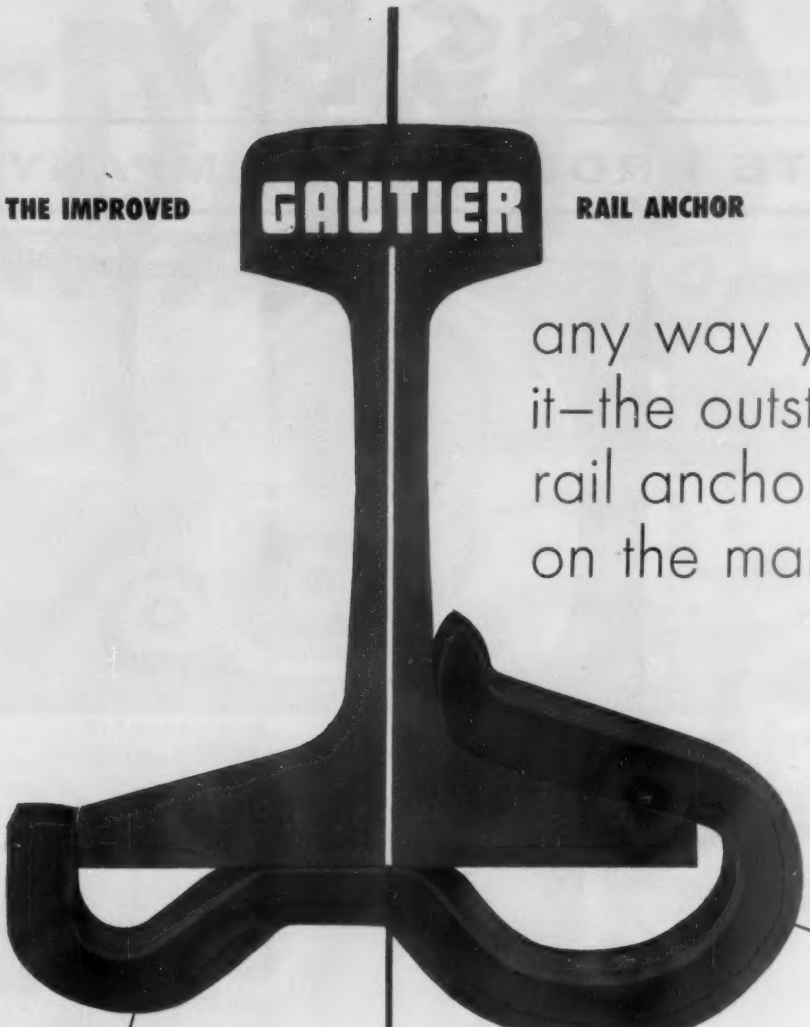
For Prompt Service, *contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.*

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints

THE IMPROVED **GAUTIER** RAIL ANCHOR

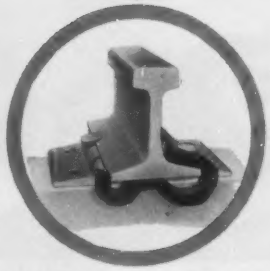
any way you look at it—the outstanding rail anchor on the market...



Designed with sufficient take-up to be used again and again on both new and used rail.

Made of alloy spring steel, adding years of life and usefulness, reducing maintenance-of-way costs.

Can be installed or removed with maul or spike maul, and *can't* be overdriven.



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VISIT OUR BOOTH 183

Write for complete information and folder about this outstanding rail anchor.

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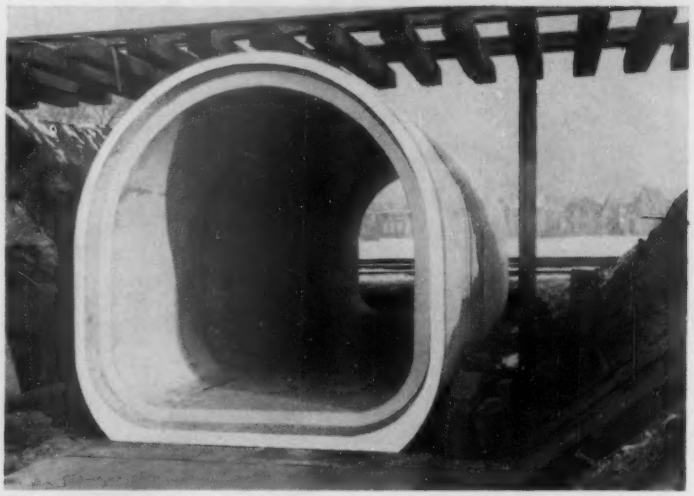

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DAVIS

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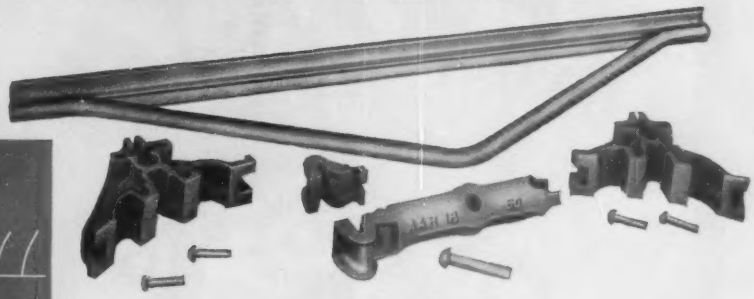
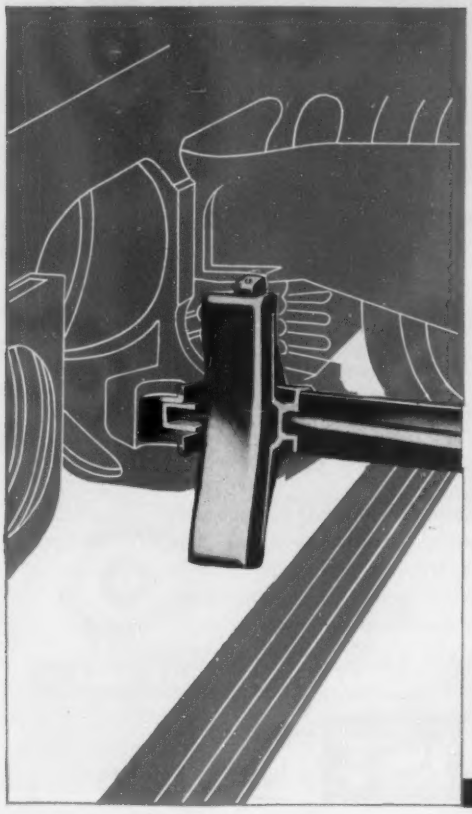
Whether for Conventional Hanging or for UNIT TRUCKS Davis Solid Truss Brake Beams are DECISIVELY SUPERIOR.





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Without Disturbing the Truss!

OTHER IMPORTANT FEATURES:

- One piece FORGED truss
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Why some people get around more than others!

The people you really want to reach are those who *like* to travel... those who can *afford* to travel... and those who travel a lot for *business* reasons.

The best way to reach them is through the pages of The Saturday Evening Post. Railways spent more advertising dollars in the Post than in *any* other magazine during the first half of 1956. Here's why:

Last year, vacationing Post families traveled 37% more than the national average! And half of *all* families with incomes of $10,000 or more are Post readers —and they're your *important* vacation travelers!

The Post also gets to the important *business* travelers. Post-reading executives took more than 3,500,000 *long* business trips on railways last year—and they're the people who buy superior accommodations!

The most travel-minded people read and trust the Post. That's why it's the best railway advertising medium in America.

The Saturday Evening POST --gets to the heart of America

TODAY AND TOMORROW

-The Envy of the World

America's Railroads are the envy of the world. In no other country are so many passengers and so much freight, moved as quickly, safely, economically... as in the U.S.A. One million tons of freight move a mile every minute, twenty-four hours a day—at an average cost of 1½¢ for each ton moved per mile.

This amazing performance is largely due to *continuing* technical improvements carried on by railroads. This technical improvement will continue to keep American Railroads in the forefront next year—next century.

Working together with railroad operating and mechanical officers, SKF is playing an important part in constantly improving rail movement... making U.S.A. railroads "the envy of the world." SKF axle journal bearings for passenger cars, freight cars, and locomotives, and SKF traction motor and generator bearings are some of the reasons railroads are able to bring you such splendid service for so little.

To Railroads, as with American Industry, SKF's engineering service, experience and production facilities will keep SKF the symbol of *better bearings for Industry.* 7605

Passenger Journal Boxes Traction Motor Bearings Freighter Journal Box

SKF®

BALL AND ROLLER BEARINGS

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manufacturers of SKF *and* HESS-BRIGHT® *bearings.*
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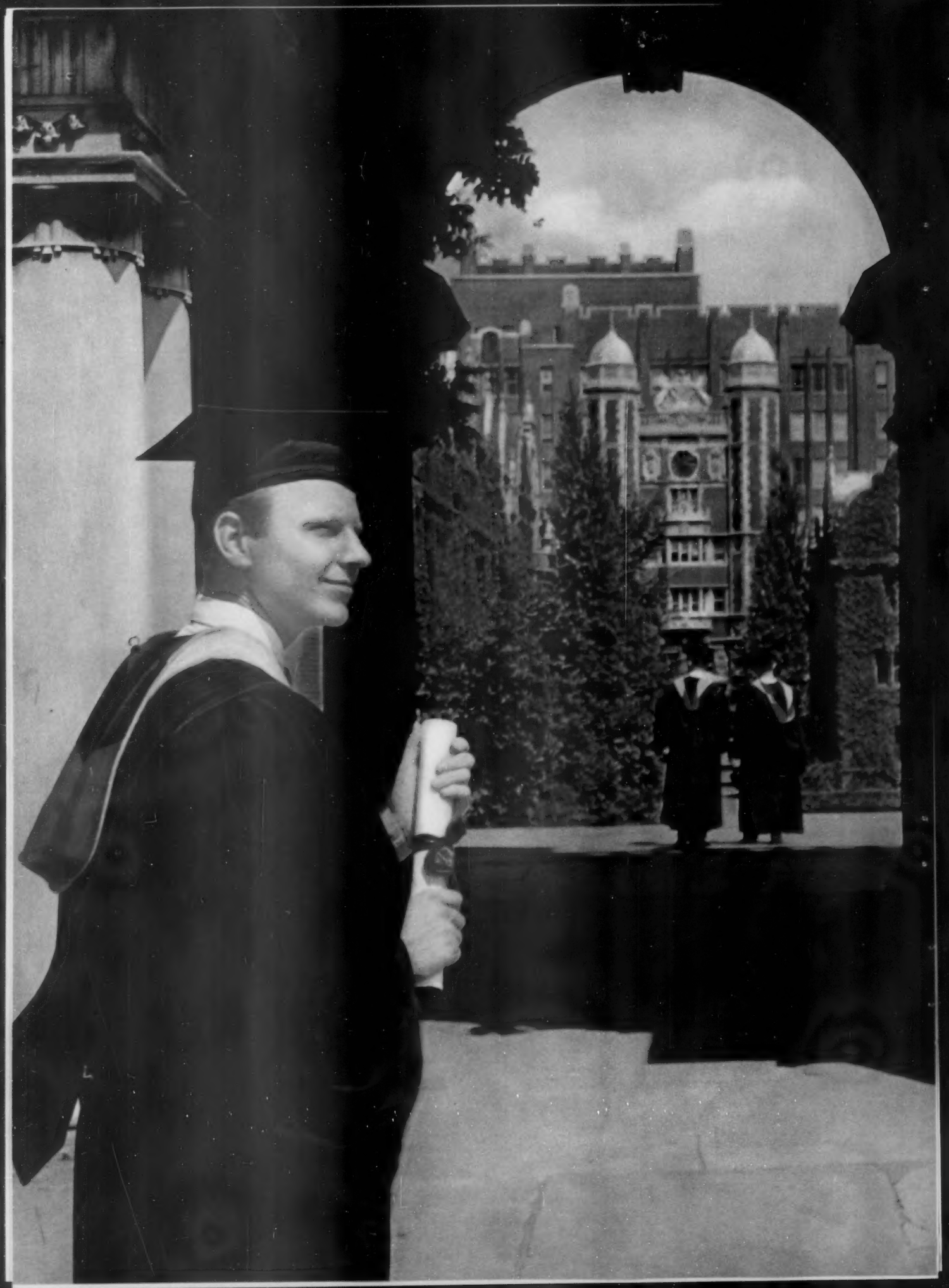

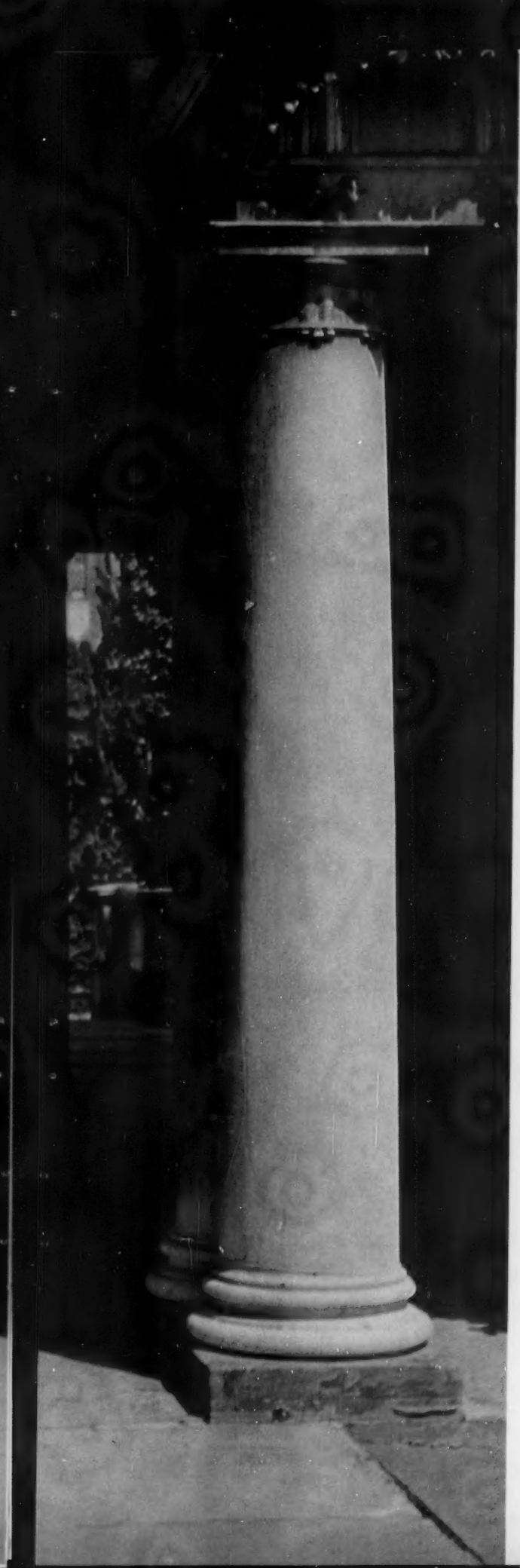

The young man in your future

He has just turned 21. In June he graduated with an engineering degree. Then, with a carefully selected number of similar graduates, he began the engineering training program at Wilmerding and started to learn about air brakes and railroading.

During the course of this program he acquires background information with respect to design, operation and maintenance of air brake systems. He takes air brakes apart. He puts them together. He tests them. He helps design and improve them. He operates them in the laboratory and on prototype trains. He visits railroad shops and observes the maintenance of Westinghouse Air Brake equipment. A year and a half later he is ready to enter the engineering or sales department, instilled with the high safety standard inherent in Westinghouse Air Brakes and determined to do his part in maintaining this traditional standard.

We are counting on this man not only for his new ideas, but also for his ability to maintain and transmit the fundamental traditions of George Westinghouse in promoting safety, dependability and economy of train operation.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PENNA.

CONGRATULATIONS ON A CENTURY OF OUTSTANDING SERVICE

from Canadian National Railways, largest railroad system in the western hemisphere and the only railway serving all ten provinces of Canada.

Over a hundred years old and more than ever a leader in modern railroading, Canadian National Railways is proud to join in celebrating the Railway Age Centennial.

CANADIAN NATIONAL RAILWAYS

Note strap upset at rivet for increased cross sectional area.

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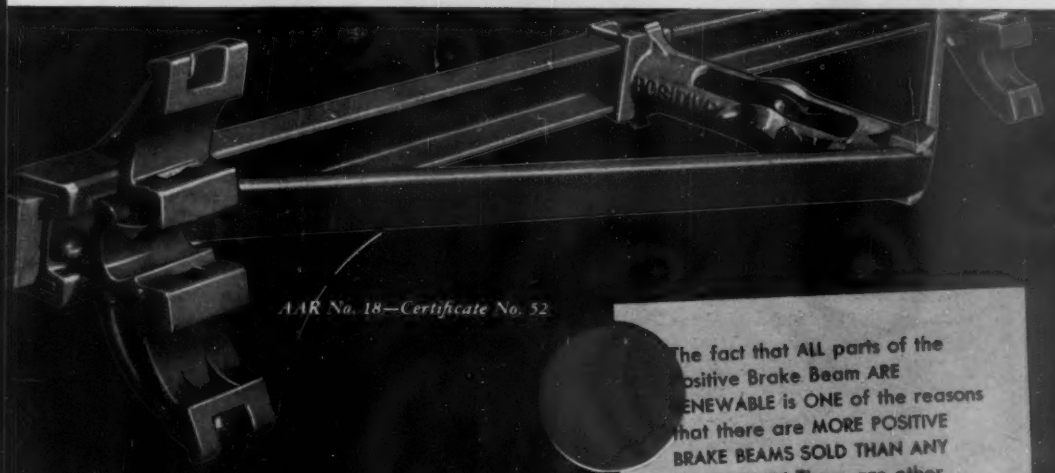

AAR No. 18—Certificate No. 52

The fact that ALL parts of the Positive Brake Beam ARE RENEWABLE is ONE of the reasons that there are MORE POSITIVE BRAKE BEAMS SOLD THAN ANY OTHER KIND! There are other reasons, too . . . Design and *dependability* mean higher efficiency for operating men—lower cost on repairs and replacement. The *real* reason is: *real reasoning!*

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to *RAILWAY AGE* for 100 years of faithful service to the American railroads. As railroad suppliers, we have benefited directly as well as indirectly from these services.

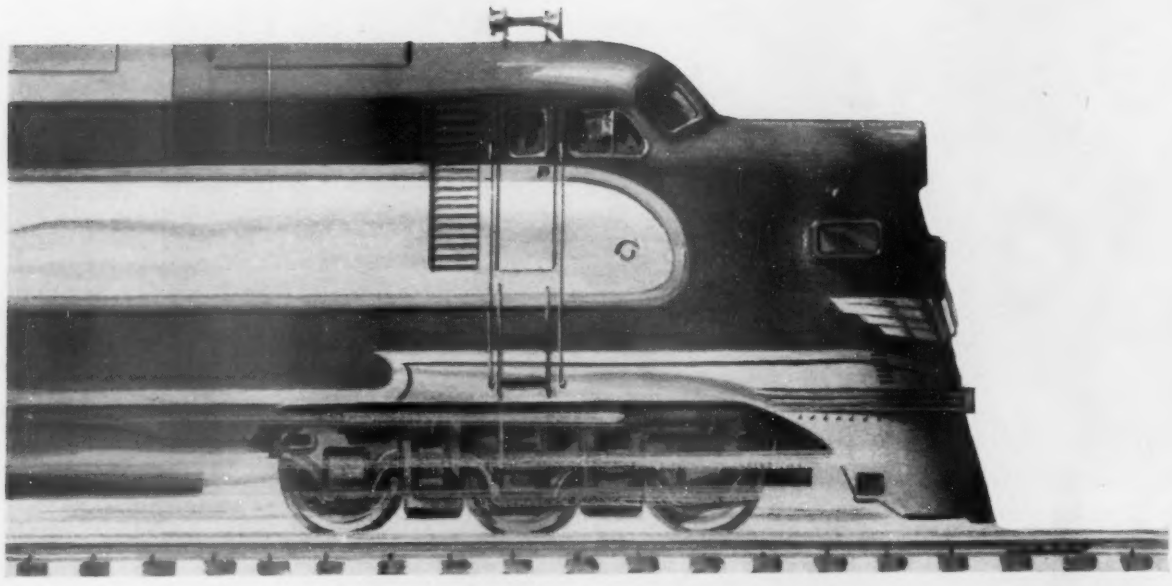
MISSOURI PACIFIC LINES

RAILWAY AGE 100th ANNIVERSARY 1856 100 1956 SEPT. 17, 1956 ISSUE

Setting the MODERN PACE in transportation

Congratulations to Railway Age . . . the magazine that has set a modern pace in the railway publishing field.

Mo-Pac, the oldest railroad west of the Mississippi, sends best wishes to another pioneer for continued success in contributing to the progress of our American railroads.



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We Have Cooperated with the Railroads in Achieving Better Track and Roadway

The railroads have come a long way in the chemical treatment of weeds and brush—and the Bogle organization has had an important role in this development.

In getting rid of weeds and roadway growth with chemicals—*there is no substitute for experience.* Bogle has a consistent record of successful results because the way has been charted for us by exhaustive on-track and right of way tests. We know our chemicals and we have the latest in modern spraying equipment to apply them for the best results.

We offer a complete, well-integrated weed and brush control service that meets today's needs at the lowest possible cost per mile.

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Complete Weed and Brush Killing Control

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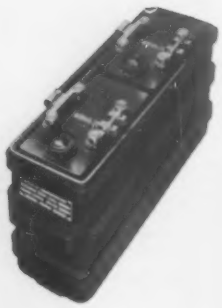

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GOULD KATHANODE
BATTERIES
for Air Conditioning
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Gould-National Batteries, Inc., Trenton 7, N. J.

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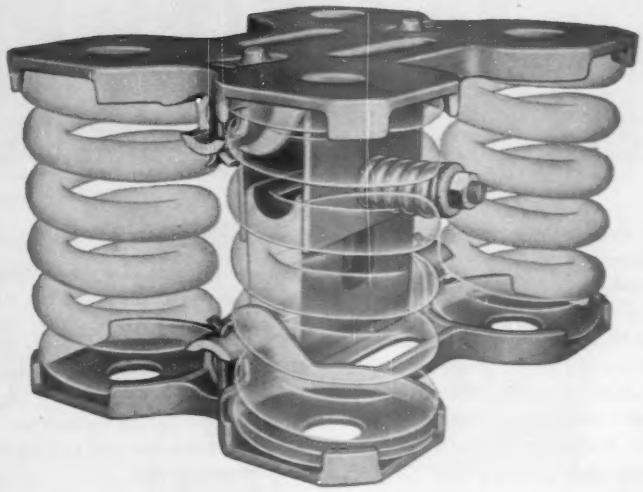
the OLDER your freight cars get

THE MORE THEY NEED

NEW-CAR SNUB-UP CUSHIONING!

OLD cars carry costly lading too! Why not cut off damage claims at the source? The majority of them originate in the older cars—a condition so simply cured at the first shopping with the application of SNUB-UP Snubbers!

✔ Reduce lading and equipment damage. ✔ No reduction in truck spring capacity. ✔ Absorbs vertical and lateral shocks. ✔ Reduces freight claims substantially. ✔ Large frictional area—long life. ✔ Spring travel 1⅛" to 3½". ✔ Working parts visible for inspection.



OUR HEARTIEST CONGRATULATIONS—and grateful appreciation to a publication which has served us and the railroads of America for one hundred years . . . RAILWAY AGE

R-1

RAILWAY TRUCK CORPORATION

332 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS

INDEPENDENT LABORATORY TESTS PROVE—

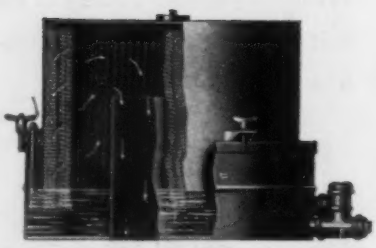
AIR-MAZE OIL BATH AIR FILTER STOPS 59% MORE FINE ARIZONA ROAD DUST THAN NEXT BEST FILTERING DEVICE!

Here's dramatic evidence of why power assembly life is greatly extended with Air-Maze oil bath air filters: An impartial testing laboratory compared the Air-Maze oil bath air filter with competitive filters. The results show that *the Air-Maze oil bath air filter removes 59% more fine Arizona road dust than the next best filtering device!*

The tests also showed that the Air-Maze oil bath air filter *maintains at least 95% efficiency even at the lowest locomotive engine speeds!* Proof positive that the Air-Maze oil bath filter doesn't depend on high air velocity to deliver top performance!

Because of facts like these, dozens of the leading railroads across the country are switching to Air-Maze oil bath air filters. They've found that this type of filter is a time tested and proven way of extending power assembly life, providing longer period without servicing, reducing downtime and cutting engine maintenance costs!

For further information on how Air-Maze oil bath filters can give *you* 59% greater filtering efficiency at less cost—call on us today! Air-Maze Corporation, 25000 Miles Rd., Cleveland 28, Ohio.



Typical Air-Maze oil bath filter that saves on engine wear and filter maintenance—pays for itself in less than a year.

The biggest names in diesels are protected by Air-Maze filters

ENGINE AIR FILTERS
CAR BODY FILTERS

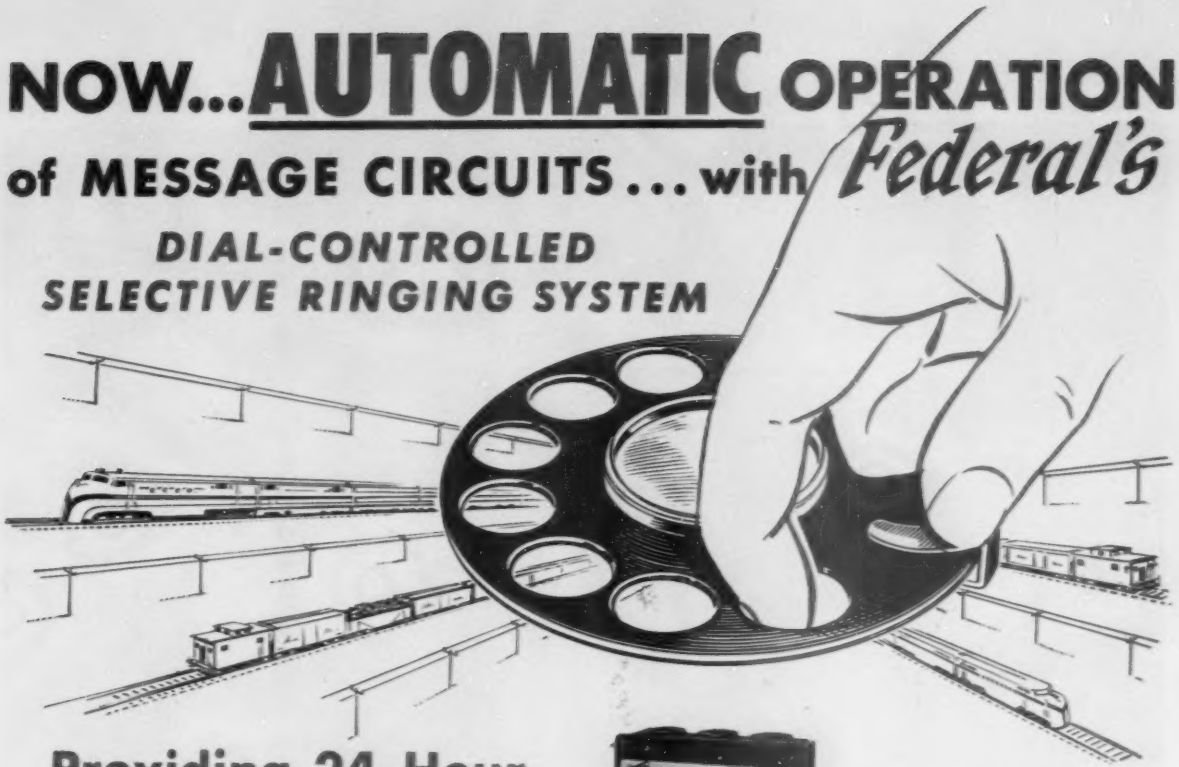
AIR-MAZE

LUBE OIL FILTERS
PASSENGER CAR FILTERS

The Filter Engineers

NOW...AUTOMATIC OPERATION of MESSAGE CIRCUITS... with Federal's

DIAL-CONTROLLED SELECTIVE RINGING SYSTEM



Providing 24-Hour INTER-STATION DIALING

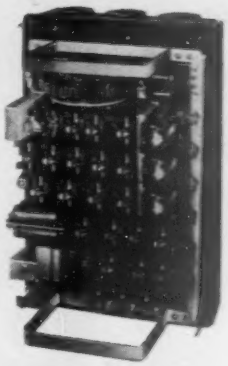
Federal's Dial-Controlled Selective Ringing System brings another important "first" to American railroads ... *fully automatic operation* of message circuits ... for greater speed and efficiency—*plus* economy!

Here is the system that permits retention of your present manual service ... or enables you to have completely unattended service. With either, you have the advantage of *around-the-clock dialing.*

The only equipment needed is a dial-controlled code generator, a distant dialing unit and waystation dialing units.

When applying Federal's Dial-Controlled Selective Ringing System to existing train dispatching facilities for station calling, the dispatcher dial unit can be located at as many dispatcher positions as desired.

Get the facts about this newest development of Federal-IT & T world-wide experience ... this *exclusive* feature of Federal's Selective Ringing System, now available to railroads for automatic, faster, more efficient and dependable train operation.



Federal's Unique DIAL-CONTROLLED CODE GENERATOR

"Heart of the System"

No other equipment like it on the market ... handles dispatching and message circuit functions automatically. The unit transforms dial pulses into 3½-cycle codes to select desired stations.

Way-station Dialing Unit

Distant Dialing Unit

For complete information on Federal's Dial-Controlled Selective Ringing System, write to Railroad Division: Dept. P-947

Federal

A DIVISION OF IT&T

FEDERAL TELEPHONE & RADIO

Federal Telephone and Radio Company

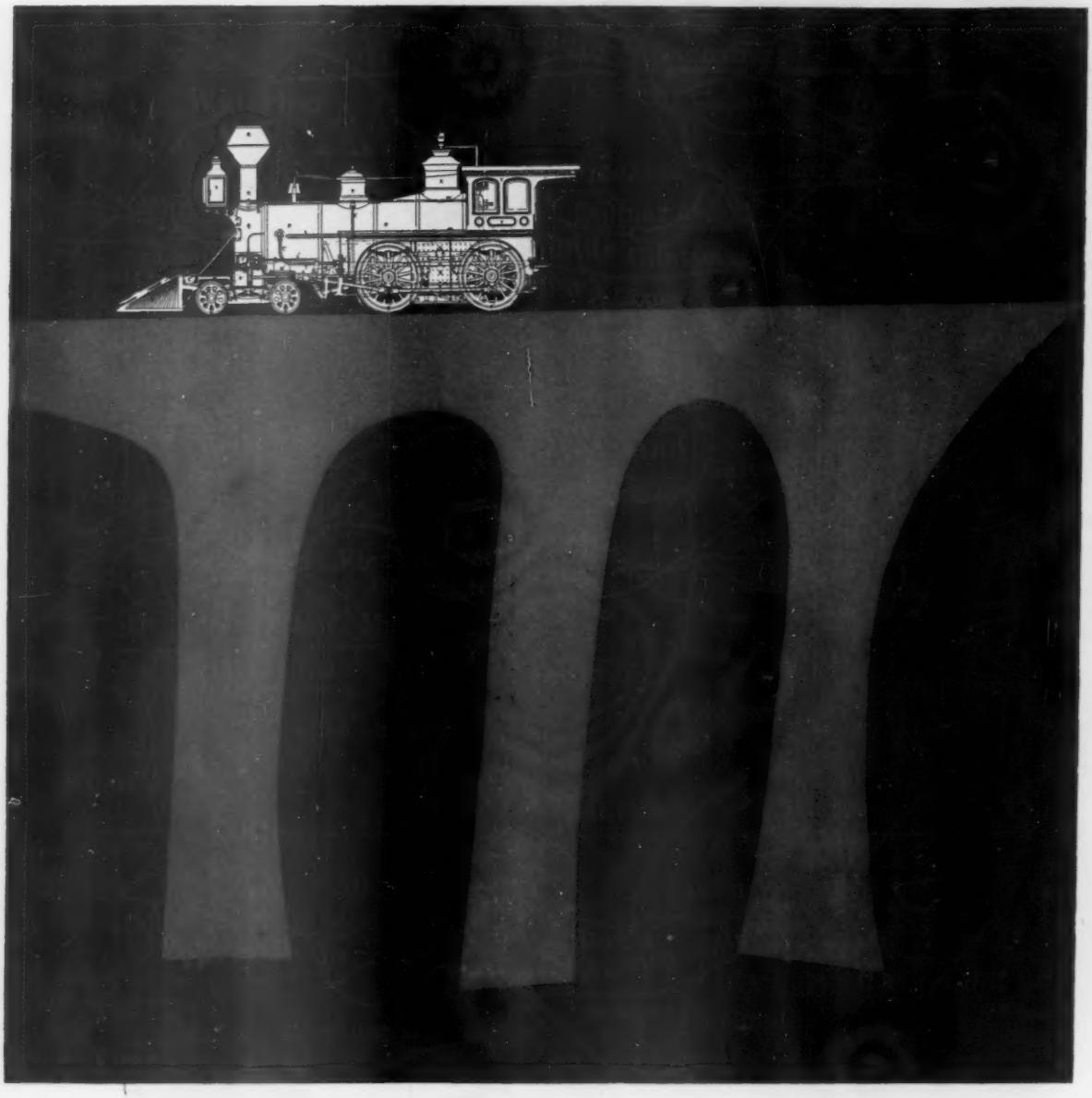
A Division of INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION

RAILROAD DIVISION • 100 KINGSLAND ROAD • CLIFTON, NEW JERSEY

In Canada: Standard Telephones and Cables Mfg. Co. (Canada) Ltd, Montreal, P.Q.

Train Radio • Sequence Switch Interlocking • Carrier Telephone and Telegraph • Microwave, Dial Telephone, Train Describing, Train Dispatching and Remote Control Systems • Automatic Classification Yards • Closed Circuit TV • Selenium Rectifiers • Battery Chargers • Wire and Cable

You can lead an iron horse to water, but...



Until 1856 the iron horse had always shied at the Mississippi. Then, the same year Rand McNally was founded, the great bridge at Rock Island was completed, and the first locomotive steamed across the river.

It was a turning point in America's westward expansion. To our young printing firm, soon to get its first real start printing railroad tickets and timetables, it meant a new challenge. Americans were hungry for inexpensive maps of the western territories.

Before long we had become expert map makers . . . turning out maps, atlases and globes for American schools and colleges. Then with the invention of the horseless carriage, America's first road maps were added to our list.

So that today, though we are printers and publishers in many different fields, it is the accuracy and dependability of our maps that many people think of first when they see the name Rand McNally.

1856 1956

RAND McNALLY

100th Anniversary

PUBLISHERS · PRINTERS · MAP MAKERS · CHICAGO · NEW YORK · NASHVILLE · SAN FRANCISCO · WASHINGTON

A report on

"Roller Freight"

from Mark S. Downes, Railway Division General Manager, The Timken Roller Bearing Company

Railroad men are eyeing the hot box problem with increasing anxiety. In addition, car availability, longer runs and increased labor costs have made them question the advisability of continuing to use friction bearings on freight cars. As a result, "Roller Freight" is gaining wider acceptance among railroad executives.

Mr. Downes is making this report to answer some of the questions that railroad men commonly ask on the subject of "Roller Freight".

What is "Roller Freight"?

"Roller Freight" is simply railroad freight cars with Timken tapered roller bearings on their journals instead of friction bearings. It's the answer to the hot box problem that causes costly freight train delays—a problem the railroads have been battling for years.

How does "Roller Freight" lick the hot box problem?

It's easy to understand. Timken bearings lick the hot box problem because they *roll* the load instead of *sliding* it. There's no metal-to-metal sliding friction. Timken bearings eliminate the *cause* of hot boxes—the friction bearing itself.

What about terminal bearing inspections and lubricant costs—does "Roller Freight" reduce them?

It reduces them to a very great extent. Timken bearings require only *one* quick inspection—an easy pat to check for temperature. Compare that to *nine* inspections required for friction bearings. With Timken bearings, the railroads can cut terminal bearing inspection time 90 per cent. And lubricant costs are cut, too—as much as 95 per cent. In fact, the new Timken heavy-duty type AP bearing assembly can go three years without adding lubricant.

How does "Roller Freight" reduce delays?

It does it by virtually eliminating the hot box problem, the main cause of freight train delays. In 1955 friction freight averaged a hot box set-out every 242,000 car-miles. You can see the immense potential of savings in time alone with "Roller Freight" wiping out hot box delays.

Now about shippers—how do they benefit from "Roller Freight"?

One of the shipper's main interests is in receiving material on time and giving his customers "on-time" delivery. Speedier shipping and elimination of hot box delays with "Roller Freight" means that shippers can count on better delivery service.

What is the significance of "Roller Freight" as a development in railroading?

Its significance lies in the fact that it marks a new era in railroad shipping. It's an important step that means not only vastly improved service, but a savings to the railroads of millions of dollars in operating and maintenance costs. It's actually the next great step in railroading.

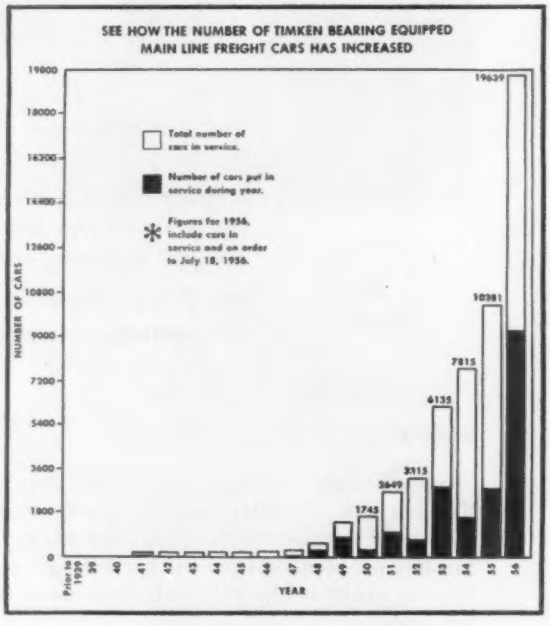
Let me cite some of the other great improvements in railroading to illustrate my point. One of the first great steps came in *power,* when the railroads changed from wood to coal-burning locomotives—and later went to Diesel power. Another great step was in *tracks,* when the railroads went from 23 different track gauges to standardized single gauge—making "Interchange" possible. Big steps in *safety* came with standardized air brakes and couplings, automatic signal systems and other devices. With "Roller Freight", America's railroads have the *next* great step.

Who pioneered "Roller Freight"?

The Timken Company pioneered it. In our work with the railroads a good many years ago, we developed the tapered roller bearing for car journals that gave birth to "Roller Freight". Timken bearings were installed on some freight cars as far back as 1923. In 1925, Timken bearings were first used on passenger cars. They were highly successful. In fact, Timken bearings made streamliner trains with their sustained high speeds possible and practical. The benefits were so obvious that the next logical step was greater use of Timken bearings on freight cars to bring to railroads all the improvements in service and operating economies that Timken bearings brought to passenger cars.

Railroads have made a healthy start on going "Roller Freight". What has held up its adoption for all freight cars?

It's true that "Roller Freight" is on its way and growing, but it has a long way to go to cover the nearly 2,000,000 freight cars still on friction bearings. Cost has been a major factor. In earlier days, roller bearings cost considerably more than friction bearings. And roller bearings were not as easy to install on freight cars as they are today. We've


SEE HOW THE NUMBER OF TIMKEN BEARING EQUIPPED MAIN LINE FREIGHT CARS HAS INCREASED
Total number of cars in service.
Number of cars put in service during year.
* Figures for 1956, include cars in service and on order to July 18, 1956.
NUMBER OF CARS
YEAR
19639
10381
7815
6135
3515
3649
1745

"ROLLER FREIGHT" ROLL CALL

Railroads having 20 or more freight cars on Timken bearings:

Akron, Canton & Youngstown
Alaska Railroad
Atchison, Topeka & Santa Fe
Atlantic Coast Line
Baltimore & Ohio
Boston and Maine
Chesapeake & Ohio
Chicago, Burlington & Quincy
Chicago Great Western
Duluth, Missabe & Iron Range
Erie
Great Northern
Louisiana and Arkansas
Nickel Plate Road
New Haven
Northern Pacific
Pennsylvania
Quebec, North Shore & Labrador
Reading
St. Louis-San Francisco
Southern Railway
Union Pacific
Wabash
Western Maryland
Western Pacific

made tremendous progress on those hurdles. Today, because of our improved designs and production methods, the Timken bearing assembly costs much less and is easy to install. In the meantime, the cost of friction bearings plus the cost of buying and maintaining devices needed to keep them operating have increased. The result is: the price gap between Timken roller bearings and friction bearings today is smaller than ever before. And the savings and advantages with "Roller Freight" are so great that the cost factor is less and less a deterrent.

What is an example of a railroad that has extensive experience with "Roller Freight"?

The Atlantic Coast Line is a good one. They first switched 21 cars from friction bearings to Timken bearings in 1949. ACL's experience in operating these cars was so impressive that they added 925 more cars on Timken bearings in 1951-52, another 2,000 in 1953. They've added more every year since. Just recently they ordered 1,800 new freight cars on Timken bearings. ACL also has a unique conversion program. Every friction-bearing freight car going into the shop for major repairs is switched to Timken bearings. ACL's new "Roller Freight" cars, plus conversions, give them 6,707 cars on Timken bearings. They're the largest "Roller Freight" railroad with 21% of their fleet on roller bearings.

How many railroads have "Roller Freight" cars, and how many do they have?

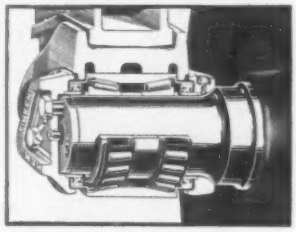
There are now 54 railroads and private car owners with nearly 20,000 freight cars on Timken bearings. And the total grows daily. An indication of recent rapid growth is in our orders: in 1955 they exceeded the previous four years combined. It's important to note also that over one-fourth of the "Roller Freight" cars recently ordered by railroads will be in interchange service—sharing the benefits of "Roller Freight" with non-owner lines.

How do the railroads view the Timken Tapered Roller Bearing as a journal roller bearing?

Right now, 7 out of 10 roller bearing freight cars roll on Timken tapered roller bearings. This gives you an idea of the acceptance of Timken bearings for this application.

What about the future of "Roller Freight"?

The future, as both the railroads and we see it, is very good indeed. "Roller Freight" has caught on in a big way and there's no question but that its momentum will increase. When all railroads go "Roller Freight", their savings will be tremendous. They'll save an estimated $224 million a year in operating and maintenance costs, earn about a 22 per cent net annual return on the investment. By cutting costs directly and indirectly, "Roller Freight" helps railroads improve earnings. And by improving service, it helps railroads get more business, more profit. Along with the railroads, we at the Timken Company have every confidence that "Roller Freight", the next great step in railroading, will mark a new era in railroad shipping that will benefit all America.



The Timken Roller Bearing Company

CANTON 6, OHIO

PICTURE OF PROGRESS. The Erie was one of the first railroads in the East to become fully diesel-powered.

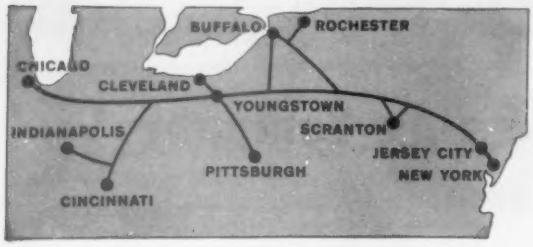
READY FOR THE FUTURE!

That's The Word Along The Erie

● The past ten years have seen the greatest improvement program ever undertaken by the Erie Railroad in its 124-year history. In this decade the Erie has become a new railroad, with a new look.

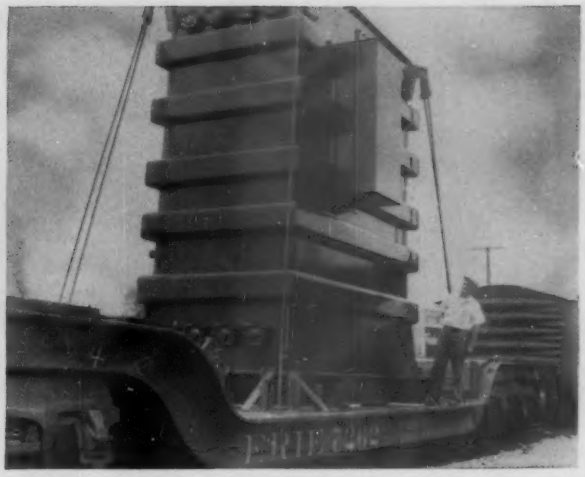
Over $165 million has been spent to put Erie in its finest physical condition. Almost every segment of the railroad has been completely rebuilt and modernized—motive power, track equipment, communications, shops, yards, signals, office machines, and all the other necessities for good railroad operation.

Here is concrete evidence of the Erie's faith in the future. It represents a mark of progress in efficient, dependable service today—plus sound planning to meet industry's transportation needs of tomorrow.



Erie Railroad

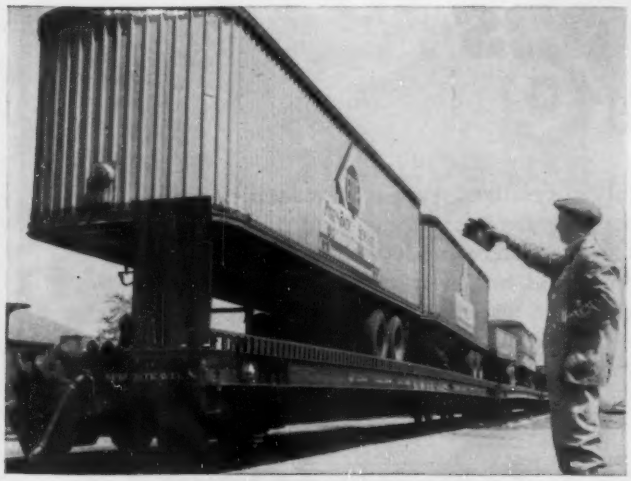
FAMOUS ERIE "ADVANCE 74"—offers second morning delivery from Chicago to eastern markets. Favorite of western fruit growers, it has earned Erie the reputation as the "Route of the Perishables"



ERIE'S HIGH AND WIDE CLEARANCES, plus a heavy-duty roadbed provide American industry with prompt dependable service for oversize shipments like this giant transformer.

MODERN TRACK MACHINES like this ballast cleaner, help keep the Erie roadbed in tip-top shape. Trains ride smoother, safer—on high speed schedules.

ERIE'S COMPLETE RADIO-TELEPHONE system enables train crews to communicate with one another, with passing trains, with wayside stations. Delays are avoided, dependable service maintained.



ERIE PIGGY-BACK SERVICE provides shippers with the flexibility of trailer shipments and the dependability and speed of rail service. To date, it has been expanded several times, the demand continues to grow.

ERIE HAS one of the largest railroad owned fleets in New York Harbor. Tugs, lighters and floating derricks provide a complete integrated service—inbound or outbound, for domestic and export shipments.

Automation . . .

but no automatons

on the Western Maryland

The vacuum tube, the transistor, the ohm, the watt and a whole battery of electronics are "working on the railroad."

On the Western Maryland, they work hard, from dispatching trains by coded track circuits to accounting by electronic computers.

Modernization tells the story of this road as of many others; new diesel "motive power" —thousands of new freight cars, many of highly specialized types. New facilities—almost everywhere.

This complete modernization provides service that backs up the warm, friendly contact and prompt attention to shippers' needs and inquiries, for which the Western Maryland has long been noted. We'd like to discuss your transportation problems with you. Just 'phone headquarters or the district office near you.

St. Paul Place, Baltimore 2, Md.

WESTERN MARYLAND RAILWAY — *Short Cut for Fast Freight*

UNI-PAK® LUBRICATOR

the proved performance with a high record of

Trouble Free Car Miles

Only Uni-Pak combines the quality advantages of wicking yarns and neoprene

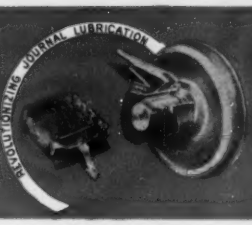
Exclusive UNI-PAK Features

1. Specially developed lubricating yarn sewn continuously through three inches of foam neoprene and terminating in non-glazing loops at top and bottom.
2. Uni-Pak's foam neoprene pad absorbs and holds more oil than other lubricators, giving maximum filtered oil to the journal.
3. Rugged cotton body increases capillary attraction. Buffers keep pad properly positioned and take up wear at fillet and collar.

200,000 UNI-PAK LUBRICATORS

now giving remarkable service on 40 roads

Write for full details about this revolutionary lubricator today



UNI-PAK CORPORATION

BOX 8302 SWISSVALE, PA.

366 MADISON AVE., New York 17, N. Y. • 120 SO. LA SALLE ST. Chicago, Ill.

when your lading demands SUPERIOR protection...

demand SUPERIOR CAR DOORS

- WEDGE-TIGHT SEALING
- LIGHT WEIGHT
- FREE ROLLING
- SMOOTH INSIDE SURFACE
- COMPLETE WATER-SHED
- LOCKS (OPEN OR CLOSED) AUTOMATICALLY

Here's lading that really requires Superior protection—ammunition! That's why weather-tight Superior Car Doors were used on this 800-car U. S. Navy order!

A TRIBUTE TO RAILWAY AGE

RAILWAY AGE has not merely given us a 100-year documentation of the story of American railroading; it has been, and continues to be, a definite influence and an integral part of the story itself.

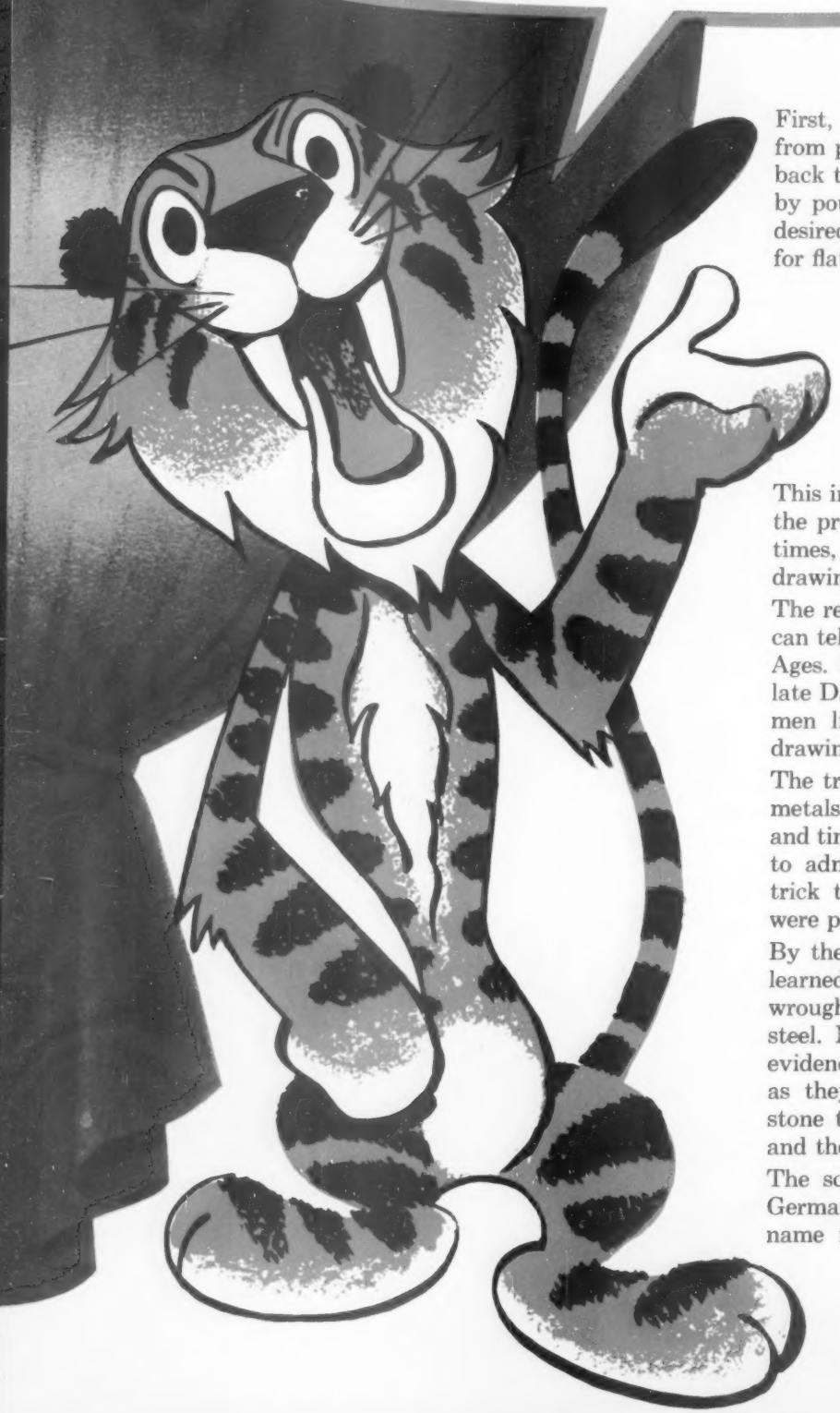
GEARED TO PROGRESS
P R I
MEMBER

SUPERIOR CAR DOOR COMPANY
332 SOUTH MICHIGAN AVE. • CHICAGO 4

S-4

AT LAST! An excuse
to tell
our favorite story!

Did you ever hear the incredible, staggering, marvelous story of how they learned to draw steel wire? Since this is our 125th anniversary, it seems an appropriate time to let you in on one of the most underplayed industrial dramas of all time.



First, a little background. Wire, mostly made from precious metals, has been found that dates back to the year 2750 B.C. It was usually made by pounding on a bar with a hammer until the desired shape was obtained. They usually settled for flat wire.

This inefficient production method gave chills to the production men even back in the Pharaohs' times, so the race was on to find a method of drawing wire through dies.

The records are kind of sloppy, but as far as we can tell, the big break-through came in the Dark Ages. Some authorities further refine it to the late Dark Ages; but suffice it to say that learned men like Theophilus were writing about wire drawing in the period from 800 to 900 A.D.

The trouble was that they could only draw soft metals like gold or a then-popular alloy of lead and tin which we know as solder today. You have to admit that it doesn't seem like much of a trick to draw *solder* through a die, but things were pretty tough in those days.

By the beginning of the 17th century, men had learned how to draw still harder metals, like wrought iron. But *nobody* could draw high carbon steel. Not that they didn't try. There is some evidence that men searched for a drawing process as they searched for the elusive philosophers' stone that would transmute lead into gold . . . and they met with the same success.

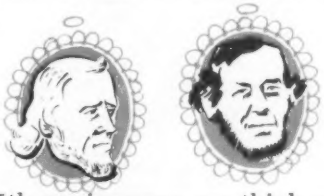
The scene shifts to the little town of Altena, Germany, around the year 1650. Our hero (his name is in dispute, but it was probably one

Johann Gerdes) had tried all sorts of wire drawing tricks. He used dozens of different die lubricants, weird types of dies, slow pulling, fast pulling, high and low temperatures. Nothing worked, so you can hardly blame him for picking up the bundle of steel rods and marching outside with them. There, he flung open the door of what might be loosely called the gents' rest room, and dumped the rods down the hatch.

Some time later, they needed more rods for the experiment, so a few hardy souls retrieved the ones that had been banished in such a dramatic manner. The rods were carried back into the little factory and they drew beautifully—the first drawn high carbon steel wire. Some profound change had taken place in the steel. They didn't know what had happened, but they liked the results.

A thriving industry grew up in Altena. And they say it was quite a sight to see the workers come in of a morning with a yoke pole across their backs, supporting a lunch bucket at one end and a common household utensil at the other—the raw materials for a day at the wire mill.

Altena enjoyed a complete monopoly on steel wire drawing for almost a century, until an obviously disgruntled worker found that dilute sour beer would also do the job. Finally, some kill-joy discovered that you could even use *water* if you did it right. The "secret" spread, and from then on, Altena had to bask in her rather impressive past glory.

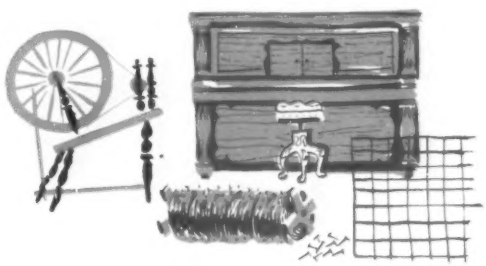


On this 125th anniversary, we think we are entitled to mention that American Steel & Wire is a highly reputable organization employing about 30,000 devoted workers who really know how to do things to wire. The original company was formed in 1831 by two live-wire gentlemen named Ichabod Washburn and Benjamin Goddard, who, if they lived in this wonderful generation, would probably own half of the United States and Canada. Brilliant as these gentlemen were, the company never really started to roll until ladies became interested in hoop skirts, because this was the first true volume market for wire!

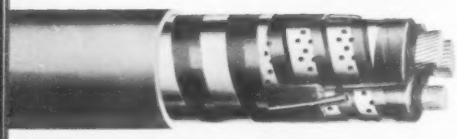
After the Civil War, the hoop skirt market went to pieces (you know how women are about fashion), and things looked pretty gloomy until barbed wire was invented around 1870. It's been one thing after another right up to the present time.

As the most knowledgeable wire maker in the USA, it was rather natural for us to begin making electrical wire and cable right at the beginning—1891 to be exact. Our salesmen frequently stumble across Tiger Brand electrical cable that has been buried in the ground or under water for 30 to 40 years and is still giving good service.

When we discuss incidents like this at our frequent sales meetings, the general comment is that our high production standards certainly don't help our replacement market very much, but fortunately, we're part of a great and growing industry. And, what with nuclear power plants and the like, there will always be a big demand for Tiger Brand Electrical Wire and Cable from buyers who want that extra margin of quality that we learned to build into our products a long, long time ago.

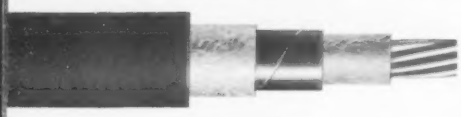


A brief summary of Tiger Brand Electrical Wire & Cable



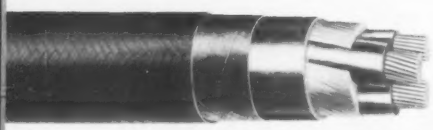
TIGER BRAND PAPER CABLE

Premium quality cable for high voltage use. Lead sheaths are applied under high pressure to insure dense surface. Lead tanks are kept under inert atmosphere to prevent formation of impurities. All constructions available, including type GN glass, neoprene fabric jackets.



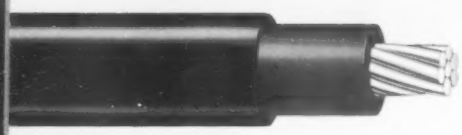
TIGER BRAND ASBESTOS CABLE

On these cables, we do *not* apply the asbestos as a twisted yarn, because the yarn will frequently open when the cable is kinked. Tiger Brand cables feature asbestos that is combed and carded, then applied as a true felt which is compressed tightly around the conductor.



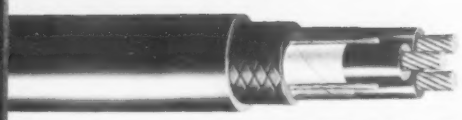
TIGER BRAND VARNISHED CAMBRIC CABLE

This is the great "in-between" insulation, for use where you want greater moisture resistance than paper has, and higher voltage ratings than offered by rubber insulations. In dry locations, varnished cambric can be used without a lead sheath, because it is not subject to oil drainage.



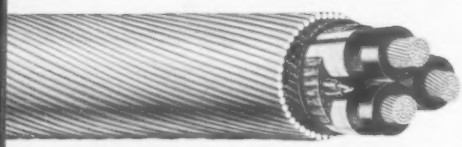
TIGER BRAND RR CABLE

Features rubber insulation and a neoprene sheath. A versatile cable—with heavy jackets—it can be buried directly in the earth. It is perfect for conduit wiring when supplied with a thin sheath. When several RR cables are combined with a bare messenger, you have a self-supporting aerial cable.



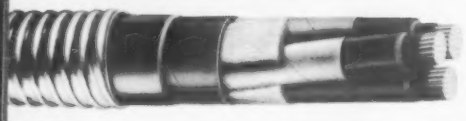
TIGER BRAND AMERCLAD

The very highest quality in *heavy-duty* portable cords and cables. All jackets are vulcanized in a lead sheath, and are permanently marked with molded identifications. High neoprene jackets show phenomenal resistance to abuse, sunlight, grease, oil or acid mine water.



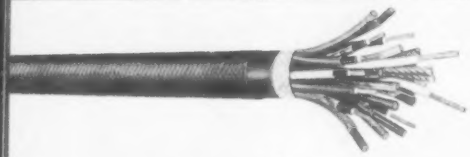
TIGER BRAND SUBMARINE CABLE

Many Tiger Brand submarine cables are still in service after 30 or more years. Heavy galvanized steel armor wires are applied with long lay to resist tensile stress. AS&W pioneered in construction of aluminum armor for salt water use.



TIGER BRAND INTERLOCKED ARMOR CABLE

Available up to four-inch core diameter, with armor of steel or aluminum. Eliminates costly conduit bending and fitting. Splices can be made anywhere along the cable's length. A great money saver for plant wiring installations, especially in cramped quarters.



TIGER BRAND ELEVATOR CABLE

Cables are carefully designed to have just the right degree of flexibility so they will bend easily at the bottom of the shaft, but not so sharply that the wires will be deformed. We also supply a complete range of annunciator, lighting and signal cable, plus hatch wire for elevator shafts.

A Standard Tiger Brand Cable for every special job

AMERICAN STEEL & WIRE DIVISION • UNITED STATES STEEL

USS Tiger Brand Electrical Wire & Cable

The glamour-coach Xplorer—lower, faster and more economical

Why travelers tell each other

"TAKE THE XPLORER..."

Excerpts from passenger comments tell why one of America's newest trains is already an old favorite

Railroading took a giant step into the future on June 3 when the Central's sleek, low-slung Xplorer raced from Cleveland to Cincinnati on its maiden run. Since then some 40,000 Americans have ridden this all-aluminum, lightweight train, giving a highly favorable answer to one of the *toughest performance tests of all*—public acceptance.

"Quite a train . . . particularly for my traveling. My fourth trip." **Cincinnati**— "*Was skeptical of lightweight trains . . . until I rode the Xplorer. Hope you'll have more trains like this.*" **Detroit**— "Like the look, the hostesses and the other wonderful extras. Better for a woman to travel on than some of the big, luxury trains." **Cleveland**— "*I usually fly or drive. But find this train beats both on certain runs. Expect to ride often.*" **St. Louis.**

Twice a day the Xplorer proves the farsighted "Train X" concept —fast, comfortable glamour-coach travel in economical equipment. Trains like this point the way to a new Age of Railroading. You'll find the Central in the lead.

Cruisin' Susan feeds passengers right in their seats. A boon to traveling mothers—a space- and labor-saver for the railroad.

Extra services at no extra fare. Smartly uniformed hostesses give extra special attention to children and oldsters . . . make family travel a more restful experience.

New York Central Railroad

A forward look

LOW-COST

for

THE Solid Journal Bearing is as basic and fundamental to freight train operation as roadbeds and rolling stock. It's a simple standard — easy to maintain or replace, low in first cost and high in efficiency. Properly lubricated and given the chance to work at optimum efficiency, it lasts for years. Because of these fundamental and inherent advantages, it's *still* the most economical freight car journal bearing *after more than 100 years!*

But even this good record is in for big improvement — improvement that means lower cost per ton-mile per hour than ever before. That's because new developments now under way will greatly improve train service efficiency and effect substantial savings in operating and maintenance costs as well.

"Controlled Clearance" Bearings

The AAR's current program to equip freight cars with "controlled clearance" bearings — standard bearings with finished bore diameters much closer to journal diameters — gives you a big extra margin of safety during initial run-in periods. Right from the start, bearing load is distributed over a wide area. Run-in time is greatly reduced and bearing life will increase by a wide margin.

Better Journal Lubrication

The program now under way to eliminate troublesome "loose waste" — either by confining packing under the journal or by using approved pad or mechanical lubrication—will still further increase the economic advantages of low-cost solid bearings. It's sure to mean a big drop in routine servicing costs and another big jump in bearing performance. Three year periods between detailed bearing inspections are in prospect, too — which will *halve* the costs for periodic attention.

Adoption of Journal Stops

Tests have proved that Magnus R-S Journal Stops — which prevent excessive axle movement within the box and hold the lubricator in place — will

GEARED TO PROGRESS
P R I
MEMBER

MAGNUS METAL CORPORATION

at

SOLID BEARINGS

freight cars

greatly improve bearing pertormance and lubrication, will at least *double* bearing life and reduce wheel flange wear. The use of this device, *with any type of journal lubrication,* offers still another low-cost way to cut operating costs and improve the dependability of rail freight transportation.

Because of the outstanding success of Magnus R-S Journal Stops, it is safe to assume that effective means of stabilizing the bearing assembly will be mandatory within the next several years.

The Years Ahead

Yes — for the next 100 years or more, the simple, low-cost Solid Bearing will continue to move America's freight to destination . . . more dependably and economically than ever before!

For further information, write to Magnus Metal Corporation, 111 Broadway, New York 6; or 80 East Jackson Blvd., Chicago 4.

MAGNUS

Solid Bearings

Right for Railroads
in performance
and in cost

Subsidiary of **NATIONAL LEAD COMPANY**

ELECTION YEAR... EVERY YEAR...

VOTE THE STRAIGHT RAILROAD TICKET!

Here's your ballot for better shipping . . . headed by the candidate that brought you *transcontinental service: Tee Pee Willie!* Vote for Willie, and for his running mates, every time you route a car cross country.

During its 107-year history, T. P. & W. has accumulated a "landslide of votes" . . . and during the past century, RAILWAY AGE has also earned the confidence of the railroad industry, including ours here at T. P. & W.

President.

T.P.&W.

Toledo, Peoria & Western Railroad Company

Offices in 19 principal cities **General Offices: Peoria, Illinois**

SPECIMEN BALLOT

(mark as shown to vote straight ticket)

⊗ RAILROAD PARTY

FOR TRANSCONTINENTAL SERVICE

☒ *TEE PEE WILLIE*

AND THESE CONNECTING RAILROADS

- ☒ SANTA FE SYSTEM
- ☒ BURLINGTON SYSTEM
- ☒ CHICAGO & EASTERN ILLINOIS RAILROAD
- ☒ CHICAGO AND ILLINOIS MIDLAND RAILROAD
- ☒ CHICAGO & NORTHWESTERN SYSTEM
- ☒ GULF, MOBILE & OHIO RAILROAD
- ☒ ILLINOIS CENTRAL SYSTEM
- ☒ ROCK ISLAND LINES
- ☒ ILLINOIS TERMINAL RAILROAD
- ☒ THE MILWAUKEE ROAD
- ☒ MINNEAPOLIS & ST. LOUIS RR
- ☒ NEW YORK CENTRAL SYSTEM
- ☒ NICKEL PLATE ROAD
- ☒ PENNSYLVANIA RAILROAD
- ☒ PEORIA & PEKIN UNION RAILWAY
- ☒ WABASH RAILROAD

WRITE-IN CANDIDATE

☐ .....

.....

(any carrier connected with above candidates)

ELECTION DAY: EVERY DAY—POLLING PLACE: ANYWHERE IN THE U.S.A.

As one centenarian to another, Happy Birthday —the first hundred years are *not* the hardest!

During our 105 years of development, we have had to overcome seemingly unsurmountable circumstances to share in the transportation economy and to participate in the business life of our nation. These challenges were met and the Lackawanna has grown successfully.

The nature of our traffic potential has

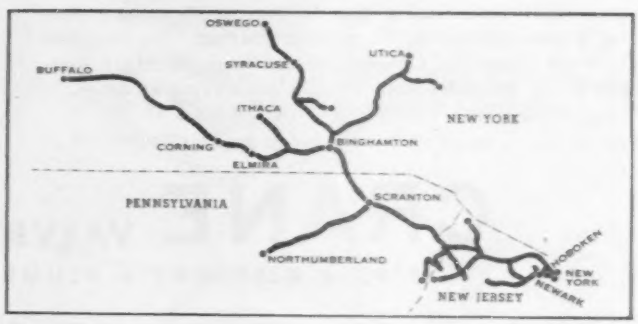
Lackawanna:

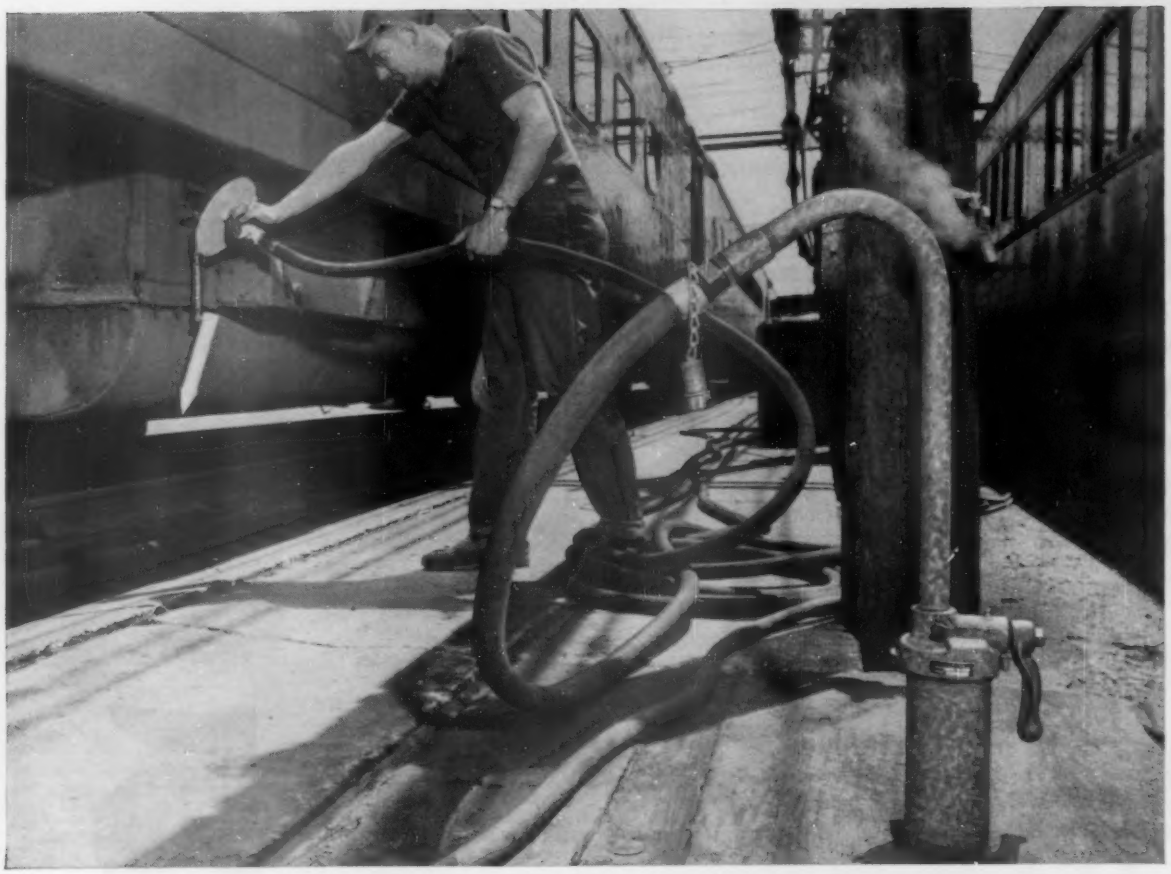
changed from time to time, but our resources—personnel, financial, property, equipment—have been prudently managed and have earned the support of investors and users.

Tried and proven technological and scientific developments, together with modern operating methods, have been enthusiastically adopted. As in the past, the Lackawanna is pledged to provide even better transportation and to haul all things all places for all people.

CENTENARIAN+5

The Route of Phoebe Snow...
Shortest Rail Route Between New York, Buffalo and the West.





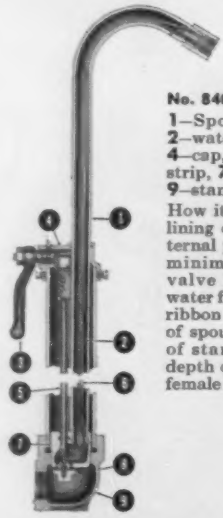
Contamination can't seep into Crane's new, improved Frostproof Hydrant

What about the water supply for your diners and passenger cars . . . is it being contaminated by surface and sub-soil pollution that enters through your station or yard hydrants?

If pollution is a problem in your yards, it's time to change to CRANE Improved No. 840 Frostproof Hydrant. Making the change-over can be far less costly than you think.

Crane's Improved No. 840 Hydrant does not need, nor have, an unsanitary underground drain-off. It is sealed completely against contamination seepage. As a result, many health authorities recommend this Crane hydrant.

Crane's Improved No. 840 Hydrant is *frostproof!* Its superior, patented inner construction (shown right) assures free-flowing, dependable service in coldest weather. For complete details, write Crane Co., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers serving all areas.



No. 840 Improved Frostproof Hydrant
1—Spout—with female coupling; **2**—water tube, **3**—operating handle, **4**—cap, **5**—valve stem, **6**—separator strip, **7**—valve body, **8**—disc holder, **9**—standpipe housing.

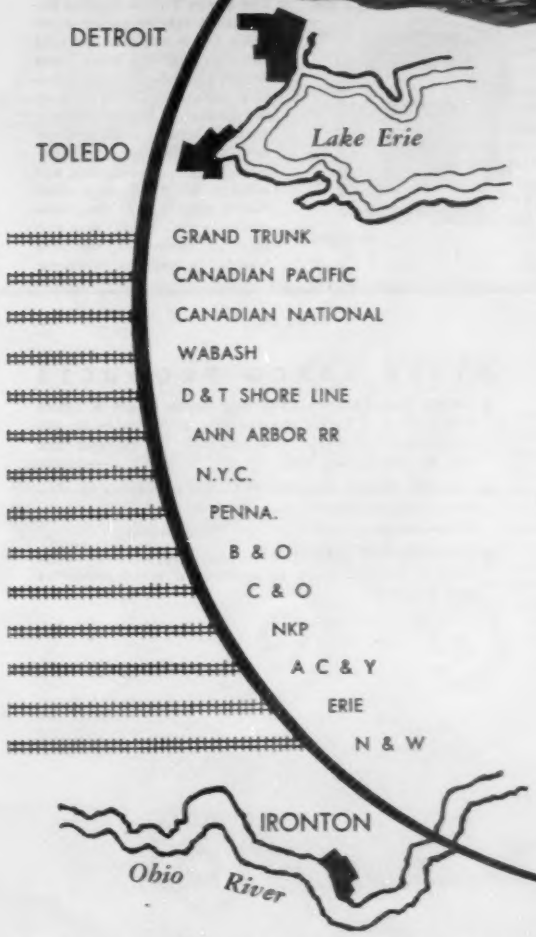
How it operates: elastic water tube lining contracts after each use. Internal plastic separator keeps ice to minimum—a thin ribbon. When valve is opened again, incoming water follows separator strip, forcing ribbon of ice out of spout. Height of spout above ground, 30"; height of standpipe above ground, 12"; depth of bury, 3, 4 and 5 ft. Size of female inlet, 1¼"; outlet, 1".

CRANE VALVES & FITTINGS

PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

A NEW SIGN
OF PROGRESS



A new trade-mark or symbol is appearing on the locomotives and rolling stock of the Detroit, Toledo and Ironton Railroad.

New engines have replaced old steam locomotives and the D.T. & I. is now completely dieselized.

New and special types of cars and equipment have been developed by D.T. & I. to facilitate the handling of shipments for the automotive and other industries.

The Ford Park Industrial Development at Lima, Ohio, recently announced by D.T. & I. Enterprises, Inc., is the first of several new industrial tracts being developed by D.T. & I. to offer outstanding location advantages.

A new department headed by an Industrial Placement Engineer is now available to help executives in their search for attractive and profitable new plant sites for their Companies.

For more information write or 'phone . . . D. E. Smucker, President

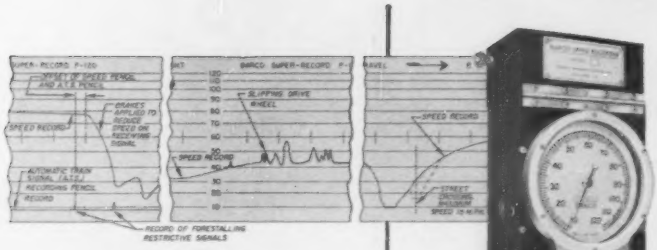
DETROIT, TOLEDO AND IRONTON RAILROAD COMPANY
Schaefer Building — Dearborn, Michigan — LUzon 4-9000

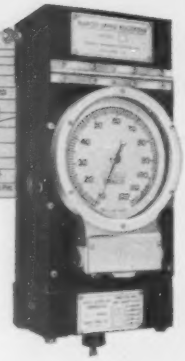
"The D.T. & I. Distributes the Products of Michigan to the Nation"

"We have the CONNECTIONS"

BARCO PRODUCTS

TRAIN OPERATION





BARCO SPEED RECORDERS

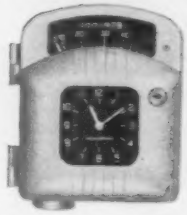
It is widely known that Barco speed tape records are (1) highly dependable, (2) invaluable in case of emergency, (3) the mark of efficient, modern operation. Equally important for you to know is that only Barco gives you the accuracy of an ALL-MECHANICAL instrument. And they hold their calibration! A typical user reports, "Accuracy within 2% at 100 MPH after a million miles of service."

THROUGH almost half a century of American railroad history the name of BARCO has been a mark of quality and sound engineering progress on products aiding operation and efficiency. Barco products are backed by experience in serving railroads all over the world. Barco quality stems from thorough knowledge of service requirements and rigid control of manufacturing standards in every detail of construction.

In the field, experienced Barco representatives are located to give you service in every area. For PROGRESS . . . for EFFICIENCY in railroading, CHECK WITH BARCO.

BARCO MANUFACTURING COMPANY
501K Hough Street • Barrington, Illinois

SWITCH ENGINE RECORDERS



The Barco Switch Engine Recorder is recommended especially for installation on yard switch engines and locals. These simple, accurate instruments provide valuable aid in helping railroads eliminate many delays, reduce overtime costs, and get more work handled. The instrument indicates speed, time, and mileage and produces a chart record showing (1) time locomotive is moving, (2) time it is idle, (3) speed, (4) distance traveled forward and in reverse.

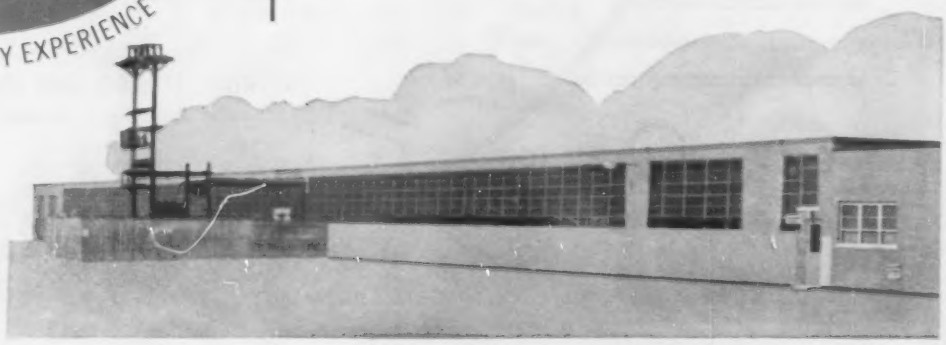
OTHER BARCO PRODUCTS

- **SPEED INDICATORS**—The new Barco Model S Speed Indicator is a highly dependable, precision built, all-mechanical instrument now available for railroad use. Ask for catalog No. 3500.
- **REMOTE SPEED INDICATORS**—For connection by electrical cable. Installation in any desired location. Accurate, dependable.
- **CALIBRATING MACHINES**—Approved equipment for making periodic check of accuracy of speed indicators and recorders.

FOUNDED 1908

BARCO

PRODUCTS BACKED BY EXPERIENCE

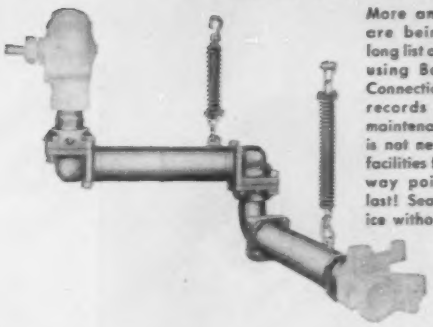


(Right) A view of the modern, new Barco plant, headquarters for engineering and manufacturing in Barrington, Illinois—a Chicago suburb.

FOR RAILROADS

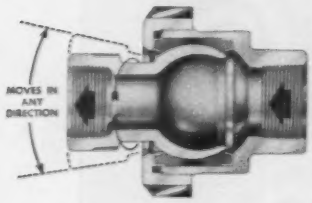
TRAIN HEATING

STEAM HEAT CONNECTIONS



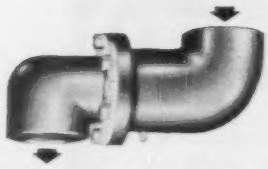
More and more railroads are being added to the long list of railroads already using Barco Steam Heat Connections because their records show much less maintenance. With Barco, it is not necessary to provide facilities for maintenance at way points. The gaskets last! Season-to-season service without worry.

FLEXIBLE BALL JOINTS



Metal pipe made flexible with Barco Ball Joints is practically indestructible. Use for railroad service continues to grow year after year: (1) to permit movement in piping, (2) to accommodate expansion and contraction, (3) to provide for alignment, (4) to insulate against vibration and shock. Sizes ¼" to 12". Wide choice of styles and materials.

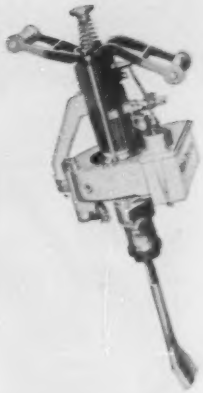
BALL BEARING SWING JOINTS



For use in loading lines and fueling assemblies. Specially designed for handling oil, water, chemicals, and other fluids. O-ring seal. Ball bearing, long sleeve design supports piping and permits uniform, easy movement. Greasing not required to maintain leakproof seal. Sizes 1" to 12". Straight, angle, double swing, and counterbalanced styles.

CONSTRUCTION AND MAINTENANCE

BARCO "TYTAMPER"

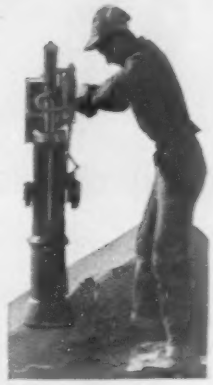


Years of experience on track construction and maintenance have proved that Barco's Portable Gasoline "Tytamper" is unexcelled for tamping crossovers, interlocking switches, and for breaking ice or frozen cinders. *Lowest* in first cost and *lowest* in maintenance cost, the Barco "Tytamper" is heavy enough to go through cemented ballast, yet is light in weight and easy to handle.

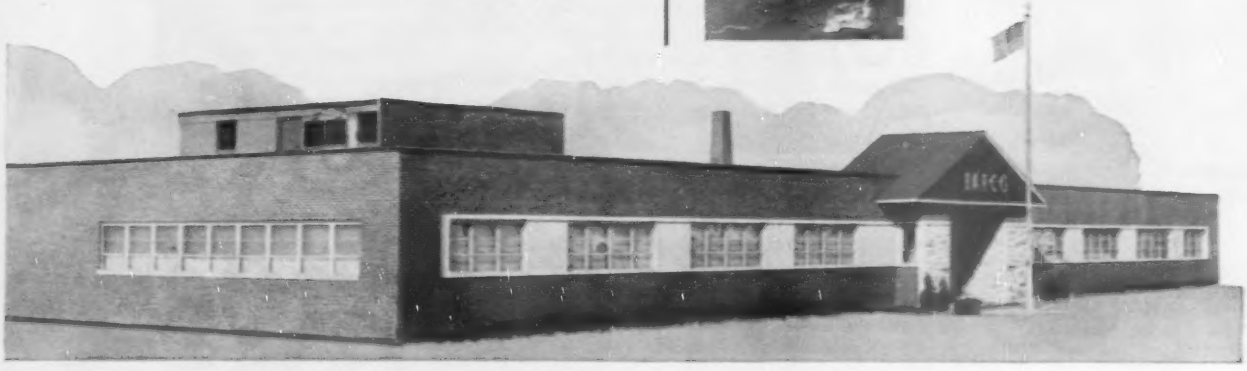
BARCO VIBRA-TAMP

Here is a new Barco tool designed for tamping and finishing bituminous surfacing materials at crossings, on walks and platforms, and in restricted areas. Also excellent for compacting granular fill materials. One man can tamp up to 750 sq. yds. of surface per hour. Gasoline powered; self-propelled; readily portable.

BARCO RAMMER

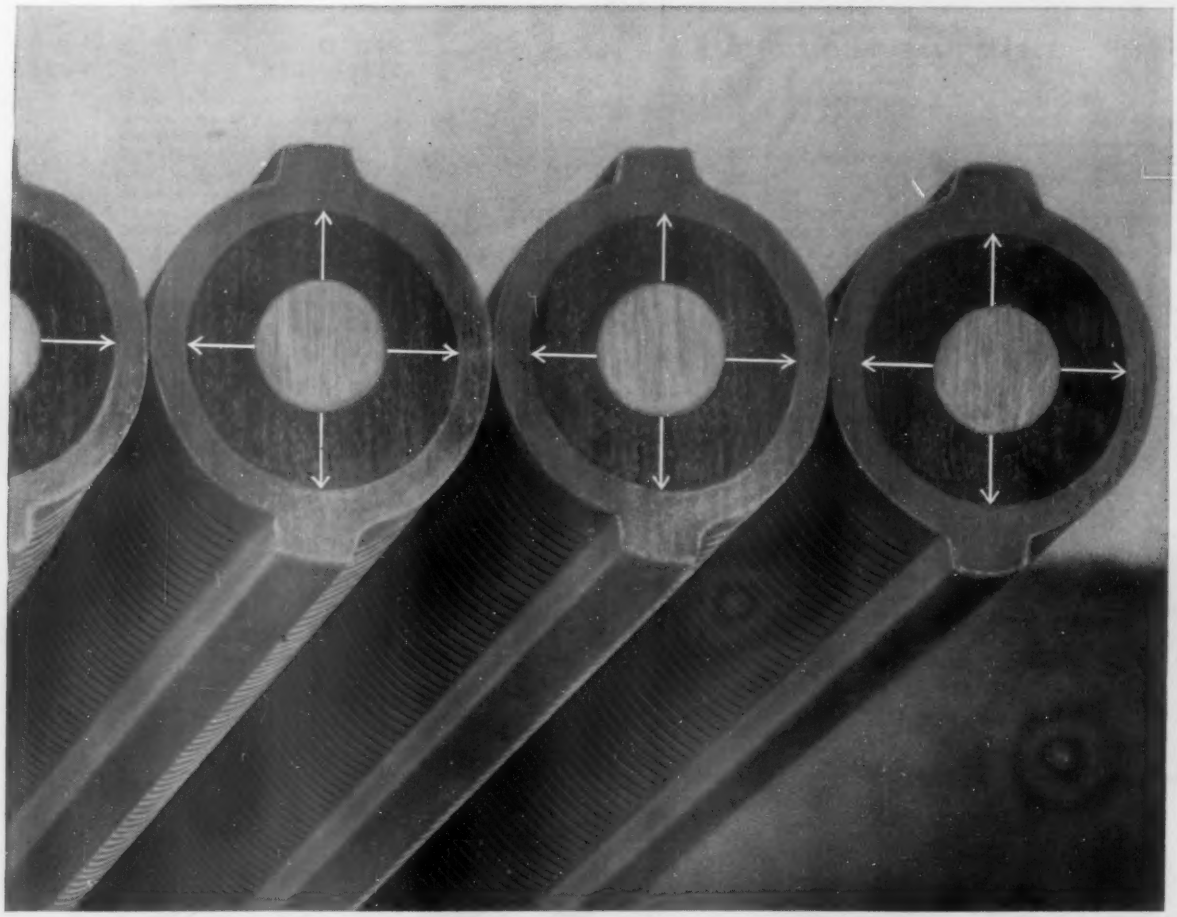


When you want *high degree* soil compaction, the Barco Rammer can't be beat! In test after test, these tools have demonstrated their ability to deliver 95% to 97.5% compaction rapidly, efficiently, and economically. The Barco Rammer is especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches.



EXIDE-IRONCLAD BATTERIES

For railway diesel starting



Power tubes expand without shedding—preserve battery life

BATTERY FOR RAILWAY DIESEL STARTING. Exide-Ironclad Model MVD. Write for Bulletin No. 5348.

Every time you discharge a storage battery, the active material on the positive plates expands. But the plate grids don't expand. This is basic.

On most batteries, the expanding active material tends to shear off from the nonexpanding grid every time the action takes place. But this can't happen in the Exide-Ironclad Battery. The reason is simple.

Active material is formed concentrically around the spinelike grid and held inside the plastic tubes. Expansion is predominantly in an outward direction—hence no shearing. Active material remains firmly locked to the underlying grid structure. And the flexible plastic tubes yield and take up as needed.

This extra protection against shedding of active material is only one of the many reasons for the long life of Exide-Ironclad Batteries. When you order heavy duty batteries, or the equipment requiring them, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

The most talked-about railroad in the West

Although Western Pacific is neither the oldest nor the largest railroad in the West, it is setting so many significant operating records... is establishing such unusually high standards to shippers and the traveling public... that it has become "the most talked-about railroad in the West".

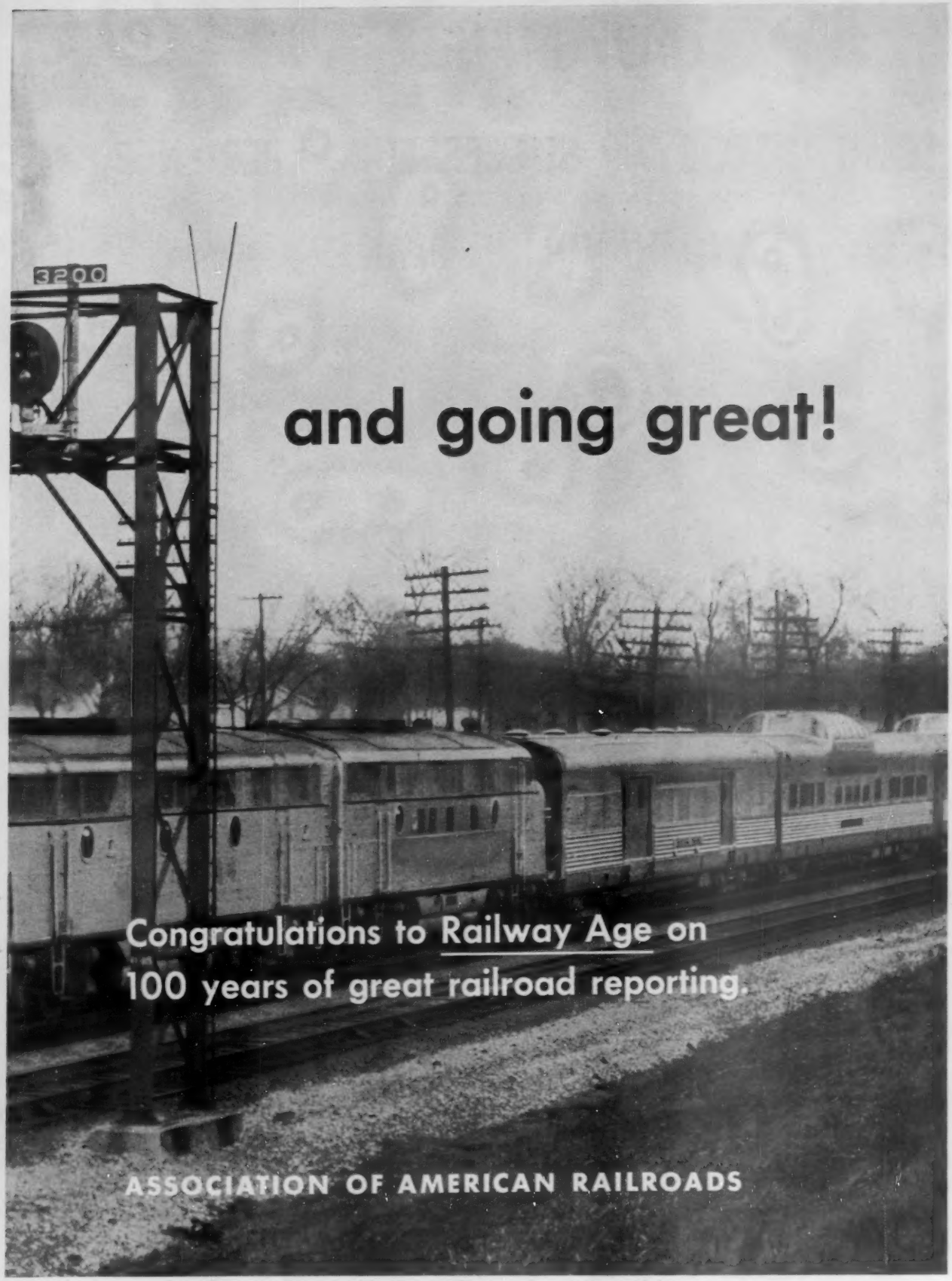
A few Western Pacific "firsts": the California Zephyr, the first Vista-Dome streamliner to the Pacific Coast; the first RDC Budd car to be placed in regular passenger service; the first Compartmentizer Cars and the first Cushion Underframe Cars were introduced by WP; and Western Pacific was the first transcontinental railroad to achieve 100% dieselization of all freight and passenger service!

WESTERN PACIFIC

ROUTE OF THE VISTA-DOME *California Zephyr*

GENERAL OFFICES: 526 Mission Street, San Francisco 5, California

HITTING 100 . . .


3200
and going great!
Congratulations to Railway Age on
100 years of great railroad reporting.
ASSOCIATION OF AMERICAN RAILROADS

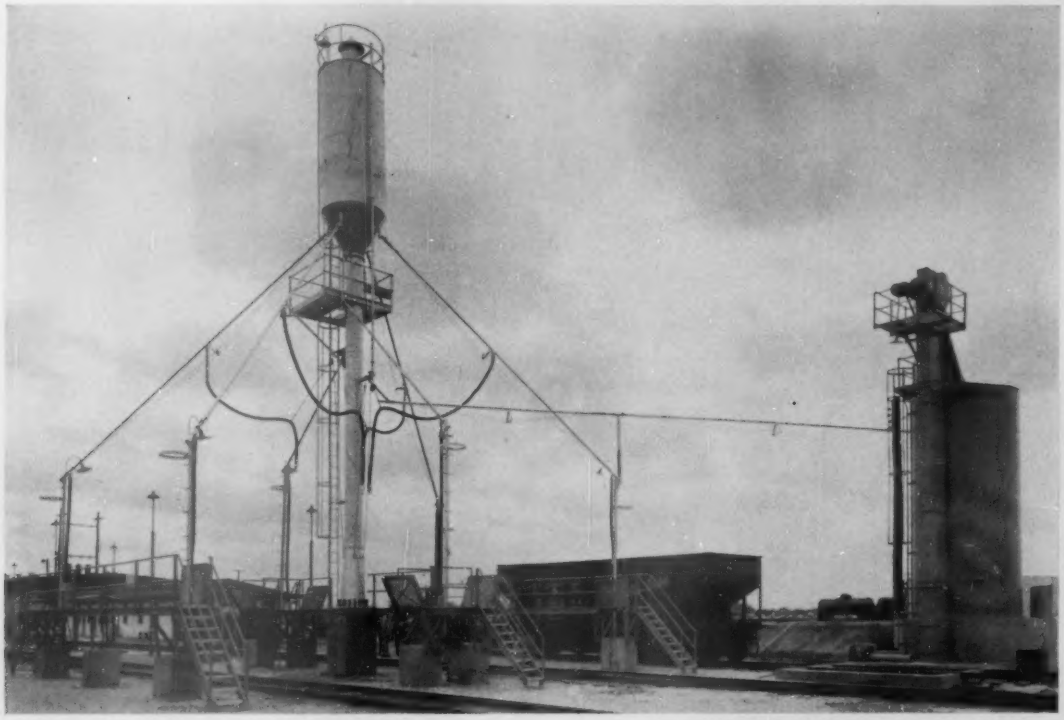
QUALIFIED

By

A LONG HISTORY OF SUCCESSFUL EXPERIENCE

CREATING AND BUILDING

LOCOMOTIVE SAND HANDLING PLANTS WORLDWIDE



Moderate conservatism, blended with creative ingenuity, has provided the solid foundations on which our business has prospered.

The plant illustrated above is an example of an installation where the special requirements called for complete mechanization of all the functions from the unloading of wet sand from cars through the drying and elevating cycle. We can make such plants completely *AUTOMATIC* requiring only periodic human attention.

You are invited to draw upon our broad experience in this field.

ROSS AND WHITE COMPANY.

CHICAGO DAILY NEWS BUILDING, CHICAGO

CLYDE P. ROSS, President—DAVID E. WHITE, Vice-President

CARLETON P. ROSS, Vice-President—R.W. BURRILL, Contracting Engineer

Since 1912

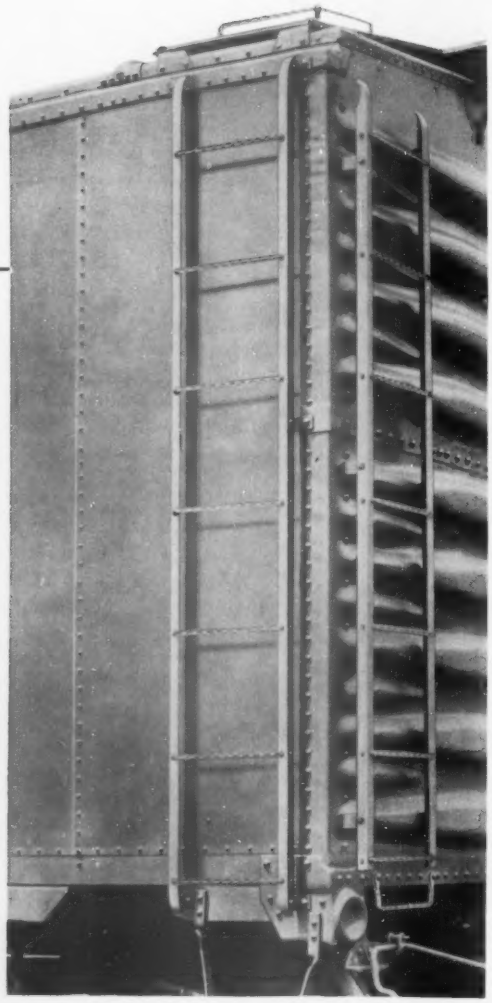
LEADERS IN RAILWAY APPLIANCE PROGRESS

WINE ..Experienced in Design and

The nation's railroads are noted for many great transportation achievements . . . one of the most important being the efficient handling of the country's heavy bulk freight.

For nearly forty-five years, The Wine Railway Appliance Company has designed and manufactured many of the important parts of hopper, gondola, flat and box cars that make this handling function possible, as well as profitable for the owners and users of the cars.

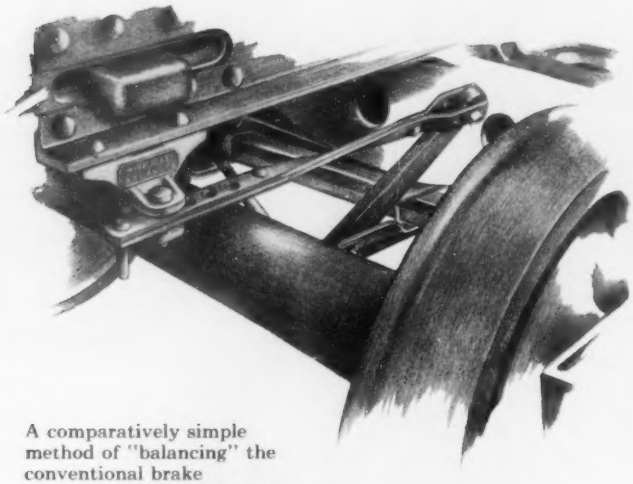
In the years ahead, Wine will continue thru its experience, engineering know-how, and manufacturing skills to keep its products abreast of the needs of the railway industry.



SAFE-GRIP LADDERS and HANDHOLDS

The only rung of its kind on the market . . . using the two-fold purpose design which provides positive rung-to-style fastening without rivets plus a better all-'round grip with patterned rungs. Shipped complete with rungs, stiles and fastening brackets.

BRAKE BALANCERS EQUALIZE FORCES



A comparatively simple method of "balancing" the conventional brake arrangement by replacing the dead lever connection to the truck bolster with the Wine Balancer to car underframe. A bracket and connector at each end of the center sill flange, engaging the dead lever, balances the brake forces by returning them to the underframe of the car.

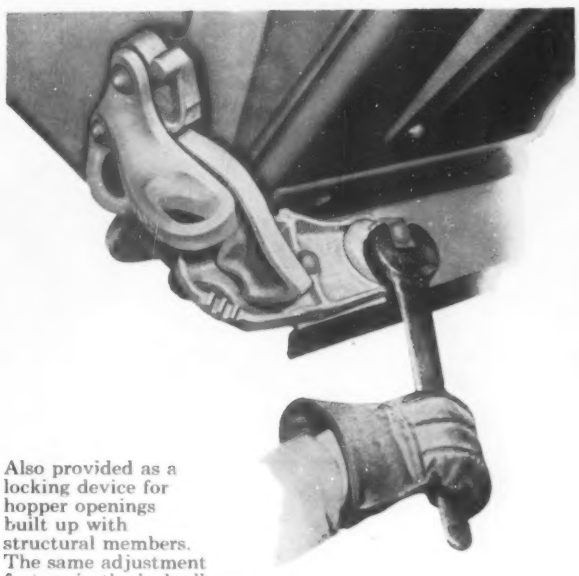
Manufacturing of Specialized Products

Typical well equipped hopper car with Wine Hopper Units and Wine Brake Balancers

CORRELATED HOPPER UNITS

The one-piece, cast steel frame unitizes each individual hopper into a structurally sound, functional assembly which assures positive door fit. Adjustable locks, cast steel hinges, and the symmetrical tapered door flange all combined offer the only door fit which may be adjusted with use to compensate for wear and other common irregularities of construction. Dual door operation with a method of controlled flow provides a balanced method of unloading.

ADJUSTABLE DOOR LOCKS



Also provided as a locking device for hopper openings built up with structural members. The same adjustment feature in the lock allows compensation for construction differences as well as door adjustment from wear during use.

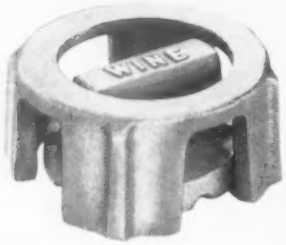
WINE

PRODUCTS THAT PROVIDE ECONOMIES..

PROMOTE GREATER SAFETY..

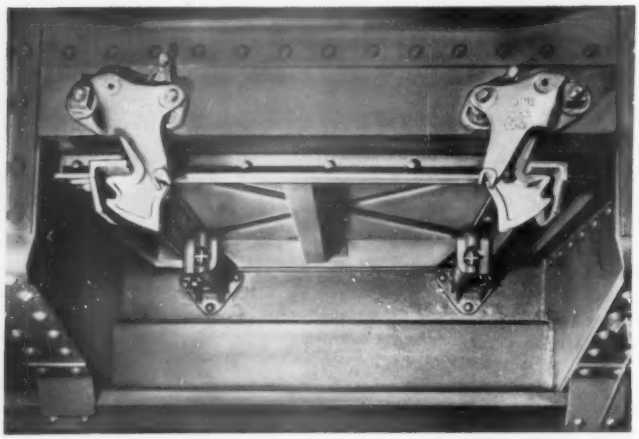
AND IMPROVE FUNCTIONAL OPERATION

Modern gondola car equipped with Wine Drop End Locks, Drop End Balancers, and Continuous Lading Band Anchors



LADING BAND ANCHORS

Two reliable methods of securing lading bands. One, the continuous offset bar for top coping application provides an anchor every 7½" of its entire length . . . and the second an individual unit for mounting flush with the floor or welding on coping at important locations to provide a rotating anchor for tie-ins from any direction. Both will handle all banding material and provide the shipper with a dependable and sufficient location for securing his products.



DROP END BALANCERS and LOCKS

The complete drop end combination from operating and security standpoints. Interlocked corners provide rigidity to keep the sides from spreading under load, while the balancer incorporates the hinge function with a one-man time and labor saving closure

DROP BOTTOM SPRING HINGES and ADJUSTABLE LOCKS

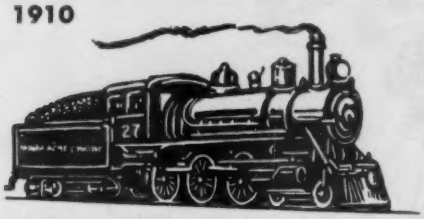
Drop Bottom Gondolas equipped with these two devices provide the shipper and receiver of the lading with a positive closure and afford a fast, economical one-man operation with selective single or multiple opening of doors.

THE WINE RAILWAY APPLIANCE CO. • TOLEDO 9, OHIO

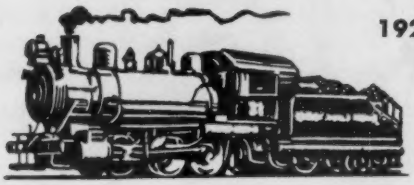
Constant Progress through the Years with Quanah Route

THE SYMBOL OF PROGRESS

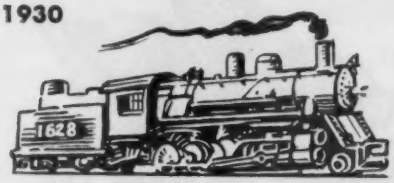
1910



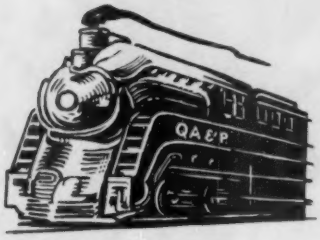
1920



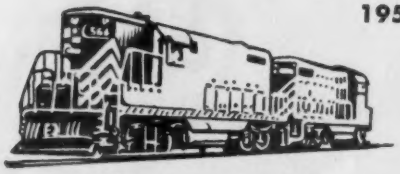
1930

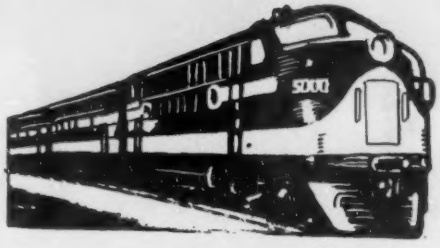


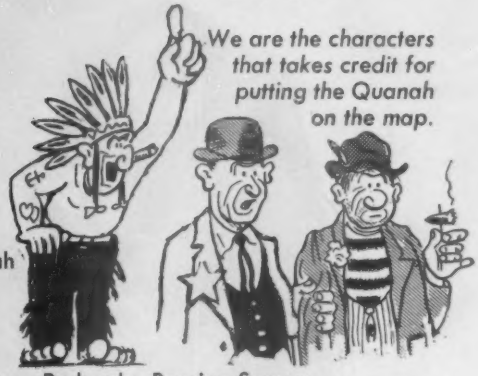
1940



1950







1902
Quanah Acme

1909
Quanah Acme Paducah

1914
Red River Quanah Acme Paducah Roaring Springs

1928
Red River Quanah Acme Paducah Roaring Springs Floydada

1938
Red River Quanah Acme Paducah Roaring Springs Floydada

Joint through Transcontinental Overhead Rates Established and Fast Transcontinental Freight Schedules Inaugurated.

1950-1956
Red River Quanah Acme Paducah Roaring Springs Floydada

Entire Line Rehabilitated for Faster Schedules and Heavy-Duty Service.

1956
Red River Quanah Acme Paducah Roaring Springs Floydada

In 1956 Fast Transcontinental Freight Schedules made Faster.

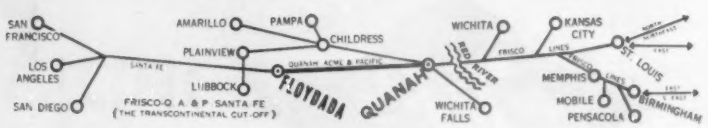
THREE DAYS—Oklahoma City to California Coast

FOUR DAYS—Memphis, St. Louis to California Coast

FIVE DAYS—Atlanta, Cincinnati, Detroit to California Coast

SIX DAYS—Charlotte, Jacksonville, New York to California Coast

THE TRANSCONTINENTAL CUT-OFF



Q A & P *The Progressive Railroad*

GO T&P SHIP

Progress

OUR NATION often is referred to as a land of plenty, which it is.

But it was not always a land of plenty. For many years, it was a rugged wilderness with all of its vast resources lying dormant in the good earth.

Our nation became a land of plenty because it was a land where people were free to dream and envision, free to explore and create.

The people of this country never have been willing to let well enough alone. They have believed that we should not be content with things as they are . . . not if creative and constructive ideas could produce improvements.

That is one of the basic reasons why we live today in a land of prosperity and plenty . . . in a land where more people enjoy more of the good things of life than anywhere else on earth.

A willingness to let well enough alone has enslaved the lives of millions of people in Asia and Africa, and in many other parts of the world. These people live today just as their forefathers did centuries ago . . . primitive and poverty-stricken . . . despite the rich resources of their land.

Such is the fate of people who persist in believing that you should let well enough alone.

This comfortable belief, if persisted in, stifles the progress of any business. The people of this country never have subscribed to it. They have insisted upon creating new and better ways of working and living.

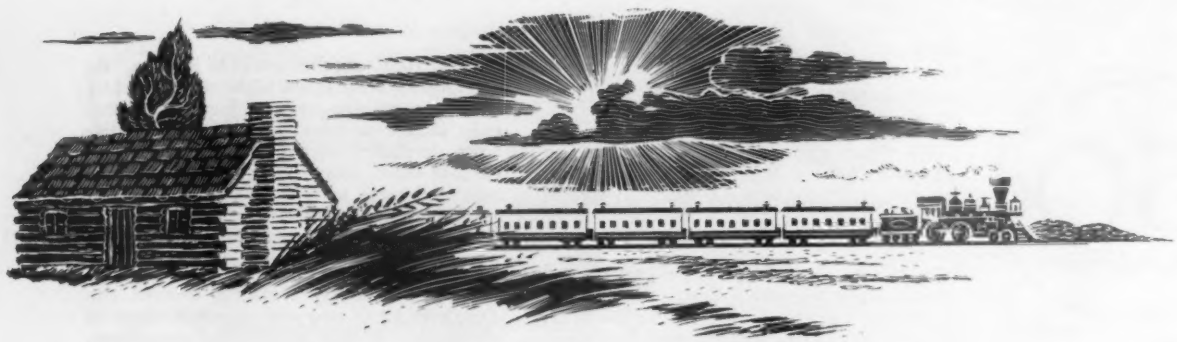
They have persisted, also, in creating new methods and practices . . . new tools and machines.

So, we live today in the richest land on earth with the highest living standard ever known, chiefly because we have not been content to let well enough alone.

It is the belief of the people of our railroad that we never should be content with things as they are . . . not if it is practical to do something constructive and progressive about them. Whenever and wherever new methods and practices, or new tools and equipment, can be used to produce better and more efficient services, they have been adopted.

That is the progressive policy of our railroad . . . a policy which reflects our unwillingness to let well enough alone.

W. G. VOLLMER
President



TEXAS AND PACIFIC RAILWAY

NEW WORLDS AHEAD...WITH 50 YEARS BEHIND US!

VANADIUM CORPORATION OF AMERICA
Our 50 Years of Progress
1906 1956

1956 marks our fiftieth year of service to the Railroad Industry. We approach it at a time when the need for finer, more versatile materials poses an exciting challenge to all of us.

Fifty years ago, we ventured into the challenge for the first time. Teamed with America's metalmakers, we made important contributions to a growing nation's need for improved railroad equipment.

For it was through the ferro alloys and metals which Vanadium Corporation helped pioneer and produce – that better alloy and stainless steels and cast irons were developed. These in turn helped to make possible many modern wonders of railroading... swift, luxurious passenger trains... strong, lightweight freight cars... corrosion-resisting tank and refrigerator cars... powerful, all-purpose locomotives.

Now in 1956–another world of ideas awaits fulfillment: New lightweight stainless steel trains, gas turbine-powered locomotives and even atomic-powered locomotives – a distinct possibility within a decade or so. In each of these, designers and engineers need new and more versatile materials to reach performance and efficiency undreamed of fifty years ago.

To help achieve all this, Vanadium Corporation is constantly working toward the development of new and improved alloys of chromium, silicon, vanadium, manganese, titanium and other products to help in the production of better alloy and stainless steels and irons. All this to help keep the railroads rolling ahead to greater operating efficiency – increased payloads and profits.

GEARED TO PROGRESS
RI MEMBER

VANADIUM CORPORATION OF AMERICA
420 Lexington Avenue, New York 17, N. Y. · Pittsburgh · Chicago · Detroit · Cleveland
Producers of alloys, metals and chemicals

VANCORAM

Photo Courtesy of New York Central Railroad

He had a different view in 1869!

Eighty-seven years ago the engineer had stopping problems. There wasn't any 3-way air valve under his right hand. When he wanted to stop he whistled for brakes. Husky trainmen strained at hand wheels. Pawls and ratchets clanked, and minutes later the train ceased to roll.

Then came precision air brakes, allowing increased speed and power of locomotives. Rapid improvement took place in other areas too. Communications and signaling advanced. Scientific lighting and ventilation was adopted—in trains, at stations, in the shops. Much of this equipment was powered and controlled through electricity, and the growing list of apparatus that utilized this new energy.

From these early days, Graybar, as a pioneer electrical distributor, has expanded its services to railroads to a point where we now catalog more than 100,000 electrical items. Likewise, the Railroad Pocket List carries the names of over 100 Graybar Railroad Representatives located at strategic offices and warehouses throughout the United States.

As you constantly step up your service in speed and volume, we, at Graybar will keep pace in meeting new needs for lighting, power apparatus, communications and signaling, control equipment and tools. Remember, you can always depend upon the experience and service that stands in back of every item ordered "Via Graybar." 665-209

GraybaR
ELECTRIC COMPANY

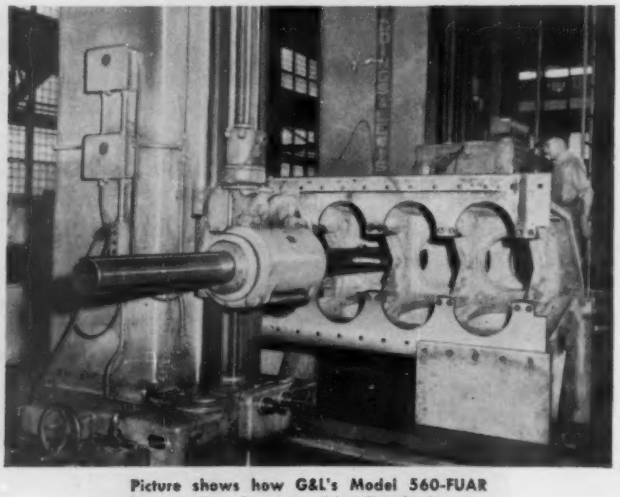
. . . serving American Railroads since 1869

GraybaR Everything Electrical

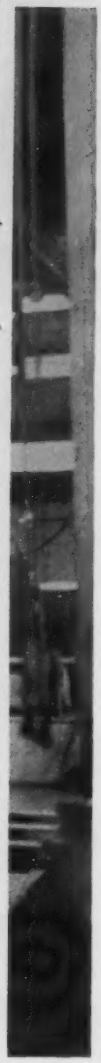
GRAYBAR ELECTRIC COMPANY, INC., 420 LEXINGTON AVENUE, NEW YORK 17, NEW YORK, IN OVER 130 PRINCIPAL CITIES

In operation at the Junianta, Pa., diesel shop of the Pennsylvania R. R., this versatile Giddings & Lewis Model 560-FUAR (floor-type) horizontal boring, drilling and milling machine performs milling and boring operations to precision tolerances on 6-cylinder engine blocks.

Giddings & Lewis Model 560-FUAR horizontal is shown finish milling the bottom rail on a 6-cylinder engine block for diesel engine.



Picture shows how G&L's Model 560-FUAR horizontal performs precision line boring operation of liner pit in diesel engine block.



SAVE time and setups

machining 6-cylinder engine blocks at railroad diesel shops

Giddings & Lewis Model 560-FUAR (floor-type) horizontal boring, drilling and milling machine is equipped with a 6" dia. spindle, underarm spindle support and end support on runway. It insures maximum productive capacity at the Pennsylvania R. R. diesel shops in Altoona, Pa. This highly versatile machine is used for milling the bottom rails and boring on 6-cylinder Baldwin engine blocks.

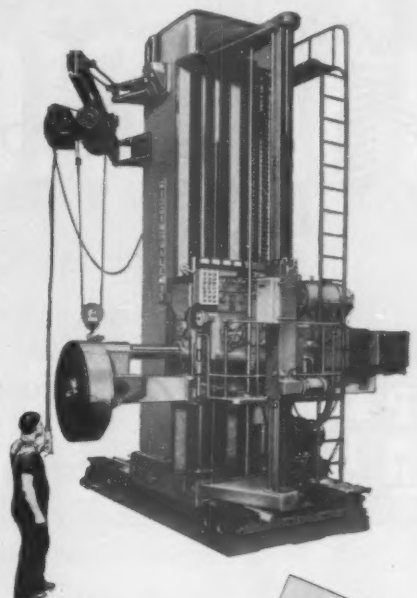
Rugged in construction, this Model 560-FUAR mills bottom rails with a 14" diameter face mill cutter with carbide tips. It also rough and finish bores to exact tolerances the six 14.750" diameter cylinder holes, using a 6" boring bar equipped with a Davis regular type two-cutter block.

What's more, when this machine is equipped with G&L's broad line of optional equipment and accessories, you can perform a wide variety of machining operations beyond the range of standard machines.

For more information on how this machine can help you increase production and lower costs, see your G&L representative, or write to factory.

Giddings & Lewis Model 570-FUAR Horizontal Boring, Drilling and Milling machine features broad line of *OPTIONAL EQUIPMENT:*

- 7-inch diameter spindle with underarm support for mounting such productive machining attachments as shaper-slotter head, angular milling attachment, 46-inch face plate drive and 48-inch continuous feed facing and boring head.
- Power hoist, mounted integrally with the machine column, facilitates handling and setting up of heavy accessories.
- Built-in elevator on machine's 21-foot column enables the operator to select the most ideal working position in relation to the headstock and work. Elevator operates independently of the machine headstock, or simultaneously with headstock as desired.
- Three independently operated d-c drive motors assure maximum flexibility for profiling and contour milling operations.

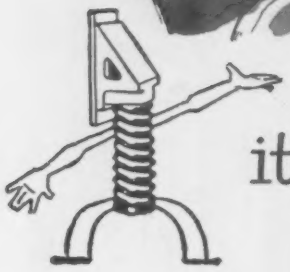


Literature Available:
For complete specifications on G&L 50 Series (floor-type) horizontal boring, drilling and milling machines, ask for Catalog No. 50-F.

G & L *and* HYPRO DIVISION
GIDDINGS & LEWIS MACHINE TOOL CO.
FOND DU LAC, WISCONSIN

G-63

Builders of the world's finest heavy-duty Horizontal Boring, Drilling and Milling Machines—table, floor and planer types; HYPRO Double Housing and Openside Planers; Planer-Type Milling Machines; Vertical Boring Mills; Spar and Skin Milling Machines, and VARIAX Machines.



it's Barber Stabilized trucks
AT BOTH ENDS!

THE MECHANICAL DEPARTMENT

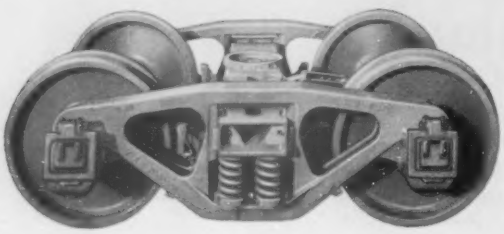
... wants easy dismantling for various servicing operations, *fast* re-assembling, *low* labor costs. Barber Stabilized Trucks ... simple in design and efficient ... provide these advantages.

GEARED TO PROGRESS
P R I
MEMBER

THE TRANSPORTATION DEPARTMENT

... wants smooth, easy rides for valuable cargoes — lowered damage claims. Transportation men want to cooperate, too, with mechanical men who *know* how Barber Stabilized Trucks save in maintenance costs. So they agree!

Specify Smoother-Riding



BARBER
STABILIZED TRUCKS

Standard Car Truck Company, 332 S. Michigan Ave., Chicago 4, Illinois. *In Canada:* Consolidated Equipment Co., Ltd., Montreal 2.

. . . 1856 → 1956 → 19??

Service of Supply
Operations
Signaling
Railroad Men
Structures
Customers
Roadway
Rolling Stock
Communications

A LOOK BACK
A LOOK AROUND
A LOOK AHEAD

These condensed "glances," mostly staff-written, reflect the views of many railroaders, suppliers and shippers. In addition, signed "Looks Ahead" present individual points of view — published as authoritative stimulant to discussion.

Service of Supply

—Big Segment of the Railroad Business

From its earliest days the railroad industry has consisted not only of the carriers themselves but as well of a group of manufacturers constituting the railroad supply industry. As the railroads have prospered, so have these services of supply; as the railroads have suffered, so have the suppliers. The two services are inseparable, each dependent upon the other. The carriers provide the country's basic transportation service; the suppliers contribute immeasurably, and always have, to making that service possible. Throughout its own lifetime, Railway Age has recognized this close relationship as a matter of editorial policy.

A book published in 1941 by the Railway Business Association, predecessor organization to today's Railway Progress Institute, took as its text the fact that railroads have traditionally left to the supply industry the job of manufacturing the devices, tools and equipment used in railway transportation. This arrangement has fostered the growth of those creative laboratories and productive plants which today develop and manufacture the innumerable things that railroads buy and use.

It is impossible to divorce the story of the growth of railroads from this paralleling story of their suppliers. The record is dotted with

---

Keeping in Touch —For Fifty Years

The following producers of railway supplies have been advertising their products and techniques—and talking maintenance—to the railroads in the pages of Railway Age for at least 50 years.

Specifically, this is a list of supply companies (or predecessors) whose advertisements appeared in the Railway Age or Railroad Gazette of 1906 and which still appear regularly.* A sizable number of today's advertisers go back much farther.

*Because of changes of name and mergers, some companies may have been inadvertently omitted from this list.

A

ACF Industries, Inc. (Rodger Ballast Car Company)
Adams & Westlake Co.
Alco Products, Inc. (American Locomotive Company)
Allied Chemical & Dye Corp. (Barrett Manufacturing Company)
American Brake Shoe Company (American Brake Shoe & Foundry Co.)
American Bridge Division, U. S. Steel Corporation (American Bridge Company of New York)
American Hoist & Derrick Co.
American Steel Foundries
American Telephone & Telegraph Co. (New York Telephone Company)

B

Bethlehem Steel Company
Bird & Son, Inc. (F. W. Bird & Son)
Buckeye Steel Castings Company
Buffalo Brake Beam Company

C

Cardwell-Westinghouse Company (Cardwell Manufacturing Company)
Chicago Railway Equipment Company
Colorado Fuel & Iron Corp. (Worth Bros. Company)
Crane Company
Crucible Steel Company of America

D

Dearborn Chemical Company (Dearborn Drug & Chemical)
Duner Company

E

Edison, Thomas A., Inc. (Edison Manufacturing Company)
Edwards, O. M., Co.
Electric Storage Battery Company
Enterprise Railway Equipment Company

F

Fairbanks, Morse & Co.

G

Garlock Packing Company
General Electric Company
General Railway Signal Company
General Steel Castings Corporation (Commonwealth Steel)
Gliddin Company (Heath & Milligan Manufacturing Co.)
Griffin Wheel Company
Grip Nut Company

H

Heywood-Wakefield Company (Hale & Kilburn Manufacturing Co.)

names of men and companies who have contributed to the past century of progress—names like Matthias W. Baldwin, who built an improved steam locomotive in 1831 and then founded a great locomotive works; George M. Pullman, whose first modern sleeping car in 1865 was to revolutionize rail travel throughout the world; and George Westinghouse, who successfully demonstrated his new air brake system in 1868 and really started the railway safety appliance art.

This imposing roster could go on and on—Stevens, Winans, Milholland, Pyle, Sessions, Bettendorf, to name a few. Inventors all. But out of their work companies were formed, companies oft-times set up to promote and market a single patented device or product. Late in the 19th century came an era of mergers, when many of the early firms were absorbed into new corporations. Such was the case, for example, when American Car & Foundry Co. (now ACF Industries) was created in 1899 through the combination of 13 smaller companies; and with American Locomotive Company (now Alco Products), incorporated in 1901 when 8 then-existing locomotive builders were combined.

Today, the supply industry is made up of firms of almost every conceivable size—local, regional, national and international in scope—and total employment perhaps exceeds that of the railroads themselves. In "profits after taxes" the supply trade ranks thirtieth among the nation's important industries.

Before 1900, when the railroads had extended to almost all corners of the country and railroad officers were forming associations to talk over mutual problems, the supply industry assumed still another role, this time educational and promotional. Specialized exhibit groups were formed to serve with and aid these railroad organizations. Such exhibits, still evident at today's conventions, include those sponsored by the Allied Railway Supply Association, Bridge & Building Supply Association, National Railway Appliances Association, Railway Electric Supply Manufacturers Association, Railway Supply Manufacturers' Association, Railway Telegraph & Telephone Appliance Association, Signal

---

Hunt Company, Robert W.
Hunt-Spiller Manufacturing Corporation

I

Industrial Brownhoist Corporation (Brown Hoisting Machinery Company)
Ingersoll-Rand Company
International Creosoting & Construction Co.

J

Johns-Manville (Johns-Manville Company, H. W.)

K

Kinnear Manufacturing Company

M

Magnus Metal Corporation
Miner, W. H., Inc.
Minnesota Mining & Manufacturing Co. (Baeder Adamson & Co.)

N

Nathan Manufacturing Corporation
National Bearing Division, American Brake Shoe Company (More-Jones Brass & Metal Co.)
National Lock Washer Company
National Malleable & Steel Castings Co. (National Malleable Castings Company)

P

Paxton-Mitchell Company
Pullman-Standard Car Manufacturing Company (Bradley, Osgood & Sons)

R

Rail Joint Company
Ramapo Ajax Division, American Brake Shoe Company (Ramapo Iron Works)

S

Safety Industries, Inc. (Safety Car Heating & Lighting Co.)
St. Louis Car Company
Sherwin-Williams Company
Standard Car Truck Company
Standard Railway Equipment Manufacturing Company (Hutchins Car Roofing Company)
Star Headlight & Lantern Co. (Star Headlight Company)
Streeter-Amet Company (Streeter-Amet Weighing & Recording Co.)
Symington-Gould Corporation (Standard Coupler Company, Gould Coupler Company, Farlow Draft Gear Company, T. H. Symington Company)

U

Union Spring & Manufacturing Co.
Union Switch & Signal Division of Westinghouse Air Brake Company (Union Switch & Signal Co.)
United States Steel Corporation (National Tube Company)

V

Vapor Heating Corporation (Chicago Car Heating Company)

W

Western Railroad Supply Company (Buda Foundry & Manufacturing Co.)
Westinghouse Air Brake Company

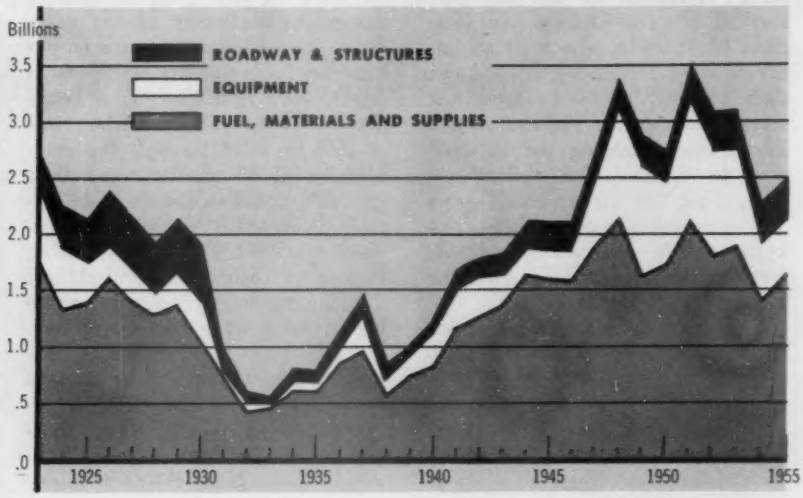
Y

Yale & Towne Manufacturing Co.

RAILROAD PURCHASES (1923-1955)

total and main categories

A mutual problem: boom-and-bust cycle of railroad buying



Appliance Association, and the Track Supply Association.

Pioneering new ideas and developments seems always to have been the long suit of the supply business; and it augurs well for the railroads that that spirit still prevails. That it does is well illustrated by what happened to steam power in the past 20 years. The diesel was a supply industry development; and its widespread adoption represented one of the greatest selling jobs ever accomplished, because it was not only a completely new kind of power but its adoption meant vast changes in operating practices built up over a century.

Seldom indeed have supply men left initial inventions unchanged and unimproved. Numberless men in hundreds of companies have worked to develop improvements.

Purchases & Stores Function

Close working arrangements between the suppliers and the railroads in ordering, packaging, labeling, storing and distributing parts and materials have kept the supply pipeline and the cost of paperwork at a minimum. New kinds of record-keeping, devised by railroad purchasing and stores officers, linked with business machines, and tied in with manufacturers' systems of parts nomenclature, are making history in controlling soaring clerical wage costs. One of the largest roads in the country is said to hold the line on its purchasing costs at about three mills per $1 of material bought. This compares with 7½ cents per $1 of purchases incurred by the federal government, according to the Hoover Commission. If the methods of government were used on the railroad, it would have to employ *21 times* the employees it now does to conform to the "system."

The lot of the supply industry is not always "an 'appy one." There is an old saw in the business that goes: "When business is good, it's great; when it's bad, it's awful." With much of its effort and capacity geared to the railroad market, the supply industry has been subject to the same sharp changes of fortune as those befalling the railroads themselves. Poor years have followed good ones, followed in turn by poor ones again, and the problem of inadequate capacity one year and excess capacity the next has been a major headache to suppliers for many years. There is ample evidence that extreme fluctuations cost the buyers money, in the long run.

The problem still is far from overcome, and the supply trade's own organization, the RPI, is, right now, among those grappling for a way to "regularize" railroad purchasing. The solution may not be forthcoming in the immediate future—the answer may lie in areas over which neither the suppliers nor the railroads themselves have control. One thing only is certain. The possible rewards for both parties warrant the search.

The constant quest for improvement, for new products and new applications, which characterizes the supply industry has other side effects, too. Competition is sharp, and over the years some companies have lost ground, even disappeared entirely as their products were outdistanced by new invention. Again, the passing of steam power provides the extreme example. Many old and respected companies saw their market quickly dry up in the stampede to diesel power after World War II, and some did not survive.

This kaleidoscopic supply industry with its peak-and-valley markets is today embarked on a trend typical of most American business. It's diversifying; and the outlook for the future is for more of the same. More and more, companies are turning away from the railroads exclusively, and are pushing out into other markets. Similarly, companies which have been successful elsewhere are now edging into the railway field. One benefit of this in-and-out trend may well be a new stability in the supply industry; another is almost sure to be a speed-up of new ideas and new inventions for the good of the railroads.

As Rock Island President Downing B. Jenks said in a recent conversation, railroads today can actually buy things that only a year or so ago were hardly past the dreamer stage.

As long as there is a need to translate dream into reality, railroad suppliers have a job to do.

The Next Decade in Operations

- How can the railroads benefit from the rise of the motor vehicle?
- How will service improvement affect efficiency?
- What are some of the new operating techniques ahead?

By GEORGE M. LEILICH
Vice President—Operations
Western Maryland

An American historian wrote, not too long ago, that nothing had altered the life of the United States so much, and so quickly, as the invention of the automobile. The highway carriers claim that the motor truck is one of the most influential aspects of that change, and that its appearance on the transportation scene has revolutionized the transport industry.

What does this mean to the railroads? Perhaps, if one reflects upon the growth of our standard of living, and our growing population, one can read into these claims the very basis for *renewed opportunity* for the railroad industry. Recent developments in electronics, the science of automation, and general progress in the field of engineering promise to the railways greater opportunity for greater safety and *capacity* without need for construction of additional route mileage of railway plant.

On the contrary, great increases in capacity of air, highway and water transport require prodigious investments—investments which increase far beyond an arithmetical ratio, as traffic congestion over existing facilities becomes a real obstacle to capacity. Here, then, is the basis of the railroads' opportunity.

The nation's total production of goods and services paseed the $400 billion mark late in the final quarter of 1955, and the President has stated the nation's economy should grow to over $500 billion annually within the next decade. This tremendous increase in the nation's economy will carry with it an equally tremendous increase of demand for transport, both freight and passenger.

The challenge to the railroad industry is to prove to business interests in general that it is in the national interest, and in the long run to their own interest, to seek the needed additional transport primarily through the more intensive use of the railways, in lieu of spending vast sums on other means of transport. To meet this challenge will not be an easy task, nor will it come about without tremendous effort and determination on the part of the railway industry, both by labor and management.

Failure to meet it can mean continuation of the past trend to lesser participation by the railways in the movement of traffic, and establishment of a disposition to use railroads only as a transporter of raw materials in bulk.

The railways have taken pride in their growing tonnages and increased gross ton-miles per train-hour—greatly aided by the introduction of the diesel locomotive. Perhaps, in the zeal for increased efficiency, the railroads have permitted, in some instances, a deterioration of overall services. Or, perhaps, there has not been the proportionate improvement in service that would otherwise have taken place from a new tool like the diesel.

This kind of activity has taken place at the same time that our competitors are taking away more and more traffic where speed and regularity are prime requirements. To prevent and reverse traffic erosion, the railroads must more generally look for *trainload efficiency* in that portion of their traffic which involves, for the greater part, the handling of raw materials, such as ore and limestone, where regularity is important and speed is secondary.

The area of traffic where trainload efficiency is possible without detriment to either the quality of the service or the competitive position of the railways is most generally that type of traffic which, by its very nature, yields a low revenue per net ton-mile. Consequently it must be handled at top efficiency, if it is not to be subsidized by other commodities. To accomplish these economies for bulk commodities, the railroads will develop means of regularizing movement—so that the "pipeline" will not have to be so great as to nullify the operational economies by excessive capital investment in equipment and facilities.

Industry will reduce its "in car" inventory only when

The Author...

At 39 one of the youngest trunk-line operating vice-presidents in the country, George M. Leilich entered the railroad business with the degree of mechanical engineer and after graduate study in transportation as a Strathcona Fellow at Yale.

His career includes service in the motive power department and successive positions throughout the transportation department of the Lehigh Valley. Attaining the position of superintendent of the Wyoming division, he left this property in 1953 to become general superintendent of the Western Maryland and, in July 1955, became vice president—operations.

Mr. Leilich stepped down as president of the American Association of Railroad Superintendents in June.

the railroads demonstrate a dependability which will justify lesser margins of safety to meet interruptions in raw material supply.

In the haulage of general freight the railways will meet their greatest challenge—here the rewards are proportionately greater. It is in this field that we must forget the Marquis of Queensberry rules and use every trick at our command.

If, for example, the motor truck is the answer for some facet of a particular movement, it will be used to advantage. Again, to offset the fast door-to-door service of our principal competitor, we must operate short fast trains with regularity—loading at the end of a working day, and making freight available at destination at the start of a working day.

The precision type of transportation which the railroads have developed in connection with automotive industry, wherein the railroads involved have actually become a real link in the assembly line of production through precise material flow, is the type of merchandise service which must become more general.

One of the biggest deterrents to such a program today is high fixed labor costs for each train operated. Railroad labor organizations have done as much research as anyone in the field of transportation development, and together with railroad management could plan what now would appear to be radical thinking—but which would overcome these deterrents to the eventual benefit of the railroad industry and everyone connected with it.

As our business has become more competitive, railroads have begun to take a greater interest in the problems of connecting lines. No longer can one line be content to say that freight was handled over its line on schedule, without being interested in whether it moved over its neighbor's line on schedule, too. Given poor overall service, railroad customers will take traffic away —whether or not three of the four participating roads were "on schedule."

The Interline Chain

Railroads in the next decade will forget ownership dividing lines, and work and plan as though a route were one system. This will mean increased classification by originating roads for the benefit of other roads, greater coordination of interline schedules, and other means of interline cooperation for the final product of better overall service.

Perhaps the greatest shame of the railroad industry today is the percentage of time its freight cars are actually standing still. With the increased cost of such equipment, means will be developed to overcome this. With the standard car so valuable a piece of equipment today, its use as a warehouse by industry cannot be tolerated.

In May 1956, some 20% of the freight cars in the nation were delayed beyond the free-time provision of the demurrage rules. This percentage of "delayed" freight cars has grown each year for the last 5 years. The railroads will develop means to overcome this in the same manner that the motor carriers have conditioned industry to the need for reasonably prompt loading and unloading of highway equipment.

Of course, the railroads have much to do to improve their own performance to minimize delays in handling both loaded and empty cars. This facet of the railroad problem will be given much greater attention in the next 10 years as its significance is becoming more generally appreciated throughout the industry.

In the next decade the railroads will expand the present experiments to encompass a wide application of equipment wherein the lading is carried in a container handled separately from the vehicle undercarriage. Past experiments in the use of containers failed largely because present-day materials-handling equipment was then lacking. Perhaps, too, the lack of necessity that today's competition has introduced stood in the way of success.

An era of highly developed motor transport has encouraged the location of industry in areas not served by existing rail lines—necessarily due to many aspects of our urban growth. Off-track industry can be served by rail only through the medium of integration with some form of motor transport. Trailers-on-flat-cars are the present approach to this problem. A solution along these lines must be developed, but at a much lesser cost than the present form of coordination. Several efforts in that direction are already on the market, and the next decade must surely see an industry-accepted development of this problem.

"Delayed Shipments"

There has been developed, both among the railroads and among the shippers, a technique known as "delayed shipment." Basically, it involves delaying less-carload or less-truckload freight at the point of origin until sufficient tonnage is accumulated to warrant direct solid carload or solid truckload movement.

The next decade will see further development of the delayed shipment scheme because, in many cases, it reduces overall transit time. Shippers of less-carload freight, and even truckload or carload shippers, have developed this technique in many instances as a means of reducing cost through "shippers cooperatives," or of obtaining advantages of reduced shipping time through making possible car or truckload lots, or even trainload lots. "Delayed shipment" is not new; it is used not only by truck lines but by the air freight lines; its more widespread adoption by the railroad industry is inevitable.

Too much stress has been laid upon the fact that freight train speeds have increased from 12.8 mph average in 1926-30 to 18.6 mph in 1955, at the same time overlooking that transit time of LCL has deteriorated severely, and carload transit time has not kept pace with our competition, nor has it improved in relation to average train speed improvement.

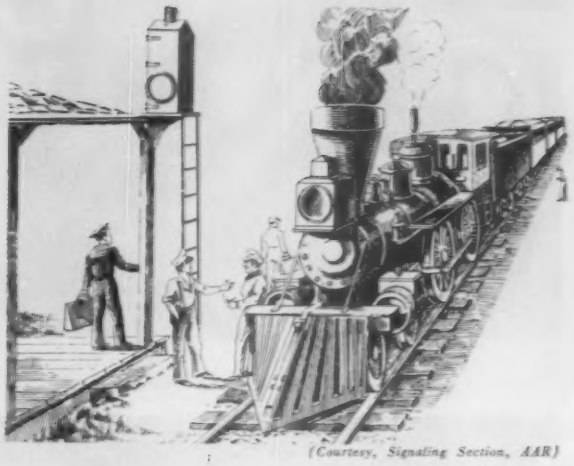
The most dramatic gains in railroad operations during the next decade will be in the area of data processing. The automatic identification of cars—which is already a reality—could be expanded in the next 10 years industry-wide and would tie in as a material aid to the increased use of various types of data processing equipment. All of this will make possible speeding up the handling of cars, freight shipments and information concerning them. Perhaps most important of all, it will enable the railroad manager to understand his own costs better and put him in a more competitive position than ever before to bid for traffic.

A LOOK BACK... A LOOK AROUND... A LOOK AHEAD...

Signaling . . .

A LOOK BACK

In the beginning, train operation was by luck, by positive meet, and by smoke signs. Then came . . .



(Courtesy, Signaling Section, AAR)

ATTENDED BLOCK SIGNALS ►

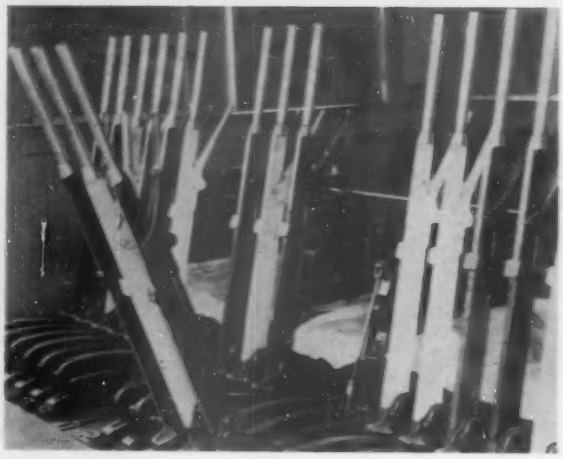
During a dark night in 1863, the United New Jersey Railroad & Canal line (now PRR) had a disastrous rear-end collision between two trains carrying soldiers from the seat of war to New York. Soon after, Ashbel Welch, general president and chief engineer, developed and installed the first manual block signal system in America. Signals were located at offices five miles apart, a man being on duty at each office. Telegraph was used for communications. Each signal consisted of a wooden box enclosing a red cloth disc, or banners, and a lamp. To display a clear light, authorizing "proceed," the operator pulled a rod to hold the banner in the upper section of the box. The system was extended throughout the territory between Jersey City and Philadelphia.

(Courtesy, Signaling Section, AAR)

CIRCUITED AUTOMATIC BLOCK ►

The track circuit was invented by William Robinson in 1872, and installed in the control of automatic signals on the Philadelphia & Erie (now PRR) the same year. This marked the first use of the closed rail track circuit—which has, ever since, been recognized as the only safe means by which a train can maintain *continuous* control of signal by occupying a portion of the track guarded by that signal.

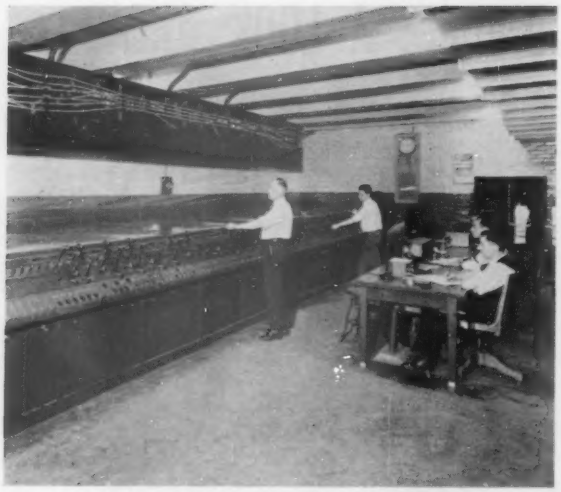
This type of track circuit, therefore, has been accepted as the basis of all automatic signaling and interlocking systems installed since that time. Robinson also developed control and operating circuits in which a break in a wire or a battery failure would control the signal to display a stop aspect. Today's fundamental safety features, therefore, were available in early signal systems.

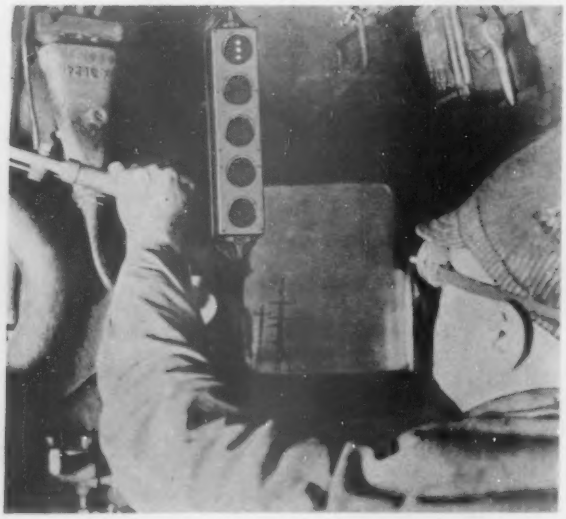


"ARMSTRONG" INTERLOCKINGS ►

The first interlocking was developed to save manpower. Where several men were needed in a limited area to operate handthrow switches, the solution was to use rods or wires from these switches to levers at a central location, so one man could move all the switches. Later, interlocking bars were added between the levers to enforce proper sequence of operation and to prevent establishment of conflicting or opposing routes.

These manpower mechanical interlockings were relatively low in first cost and in operating expenses; thousands were installed, and many are still in service. Dis-





advantages were that in large installations too much time was required to change routes, and too many levermen were required.

◄ POWER INTERLOCKINGS

Developed to eliminate the physical work of throwing the levers in mechanical plants, early power interlockings used combinations of water or air under pressure to control and operate switches and signals, no electrical controls being used. Such plants were installed in the period 1876 to 1884. In 1891 the electropneumatic switch control valve was devised, which proved so satisfactory that practically no further hydraulic installations were made. This development of the electropneumatic valve permitted the removal of all air and hydraulic piping from the machine so that only wiring for electrical circuits extended to the machine. This simplified construction.

Another development, started about 1889, was to use electric motors for operation of switch machines and signal mechanisms thus forming an all-electric interlocking system. Both the electropneumatic and the all-electric type of interlocking were widely adopted and installed.

◄ CENTRALIZED TRAFFIC CONTROL

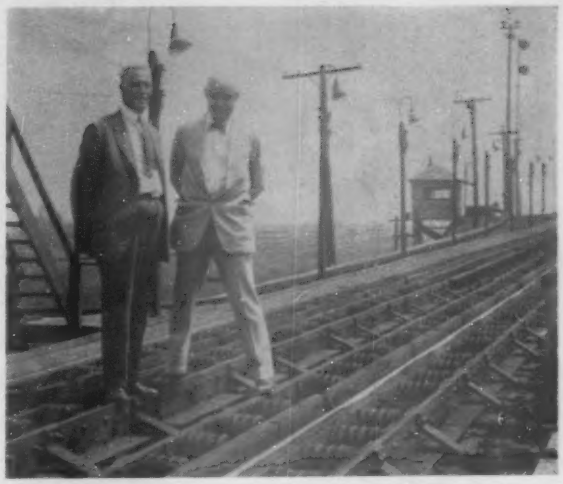
In one grand sweep, 1925 to 1927, the basic principles of (1) block signaling, (2) interlocking and (3) methods of authorizing train movements (such as timetables and train orders) were integrated into a brand new system of train operation—known as centralized traffic control. By it power switches at sidings and junctions—as well as signals at these switches—in territories ranging up to complete divisions, were placed under the control of the dispatcher. Train movements could be authorized by aspects of these signals, without the use of train orders.

Operating advantages proved so numerous that CTC has now been installed on more than 24,000 miles of track. The key factors which made this develoment possible, as applied to extended territories, were: (1) interconnection of circuits at field locations to accomplish safety instead of using mechanical locking between levers; and (2) minimizing of line circuits to those required to send out controls and bring back indications. These results were realized in a development by General Railway Signal, first installed on the NYC in 1927.

◄ AUTOMATIC TRAIN CONTROL

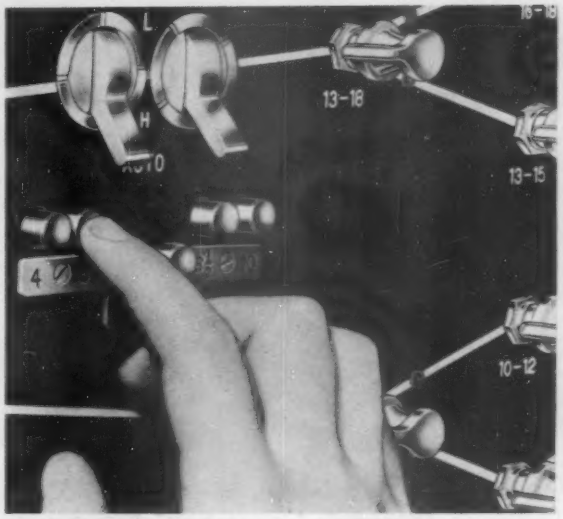
Ever since the development of air brakes and wayside signals, inventors have devised schemes for connecting the two systems so a train would be stopped automatically when an engineman disregarded a signal. Around 1921, three types of train control were in service and 31 other systems were available. To expedite its development, 49 railroads, starting in 1922, each made an installation on approximately 100 miles. Many roads have extended their installations to include principal routes. In 1923 the continuously controlled cab

signal system was developed on the Pennsylvania, as an accessory to the automatic train control. The cab signal —including whistle and acknowledger—has in the opinion of some authorities developed to be a more effective safety measure than train control itself.



CAR RETARDERS ►

From time immemorial switches in gravity classification yards were hand-operated by switchtenders. Car "riders" shepherded each car or cut of cars off the hump and clubbed down hand brakes to come to a stop on the classification tracks. Not enough trained men were available at night and during bad weather. Personal injuries were numerous. The change from all this started in 1924 when George Hannauer and E. M. Silcox, then of the Indiana Harbor Belt, invented the car retarder. In each of about 40 retarder yards installed before 1950, several control towers were used, each in a limited area. In a yard with 40 or more tracks, there would be four, or maybe five, towers, so that numerous trained operators were required. To reduce operating expenses, GRS developed a system of automatic switching which controls the switches in proper sequence, ahead of each car or cut. This system was first installed in 1950 on the Canadian Pacific.



AUTOMATIC CONTROL OF RETARDERS ►

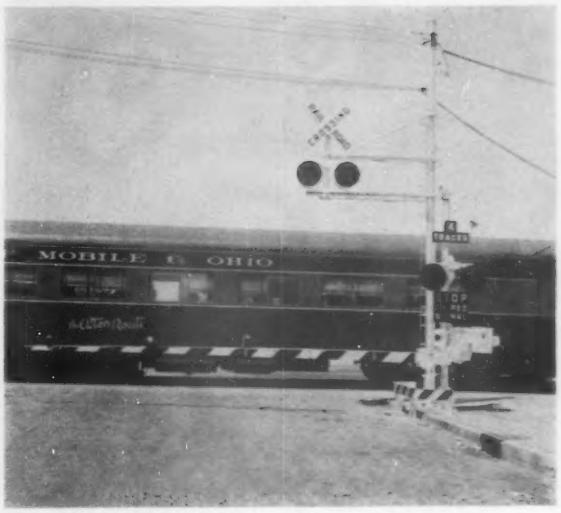
A system using short track circuits developed by the Union Switch & Signal Division of Westinghouse Air Brake Company was first applied in 1941 to a retarder leading to a scale in a yard on the Norfolk & Western. Automatic control was applied in a whole yard on the Milwaukee in 1952. Based on the weight of a car as shown in switch lists, and other factors, the towerman adjusts a lever which determines the speed at which a retarder will release the car. Short track circuits, in the length of the retarder, measure the speed and control the operation of the retarder accordingly, to release cars at the speed called for. The system can include a selection of six different release speeds as desired—as for example, 4, 6, 8 and 10 mph.

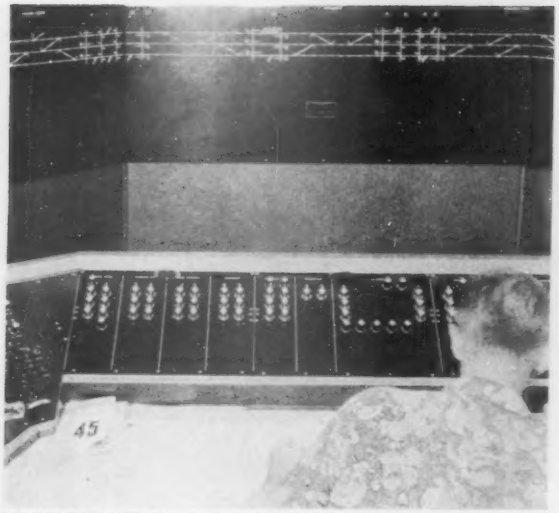
AUTOMATIC CROSSING PROTECTION ►

In the days of old dobbin, road crossings were protected by fixed signs; the locomotive whistle and bell gave adequate warning. The coming of the automobile necessitated movable, visible signals. In 1923 the AAR Signal Section adopted flashing-light signals; thousands of such installations are now controlled automatically.

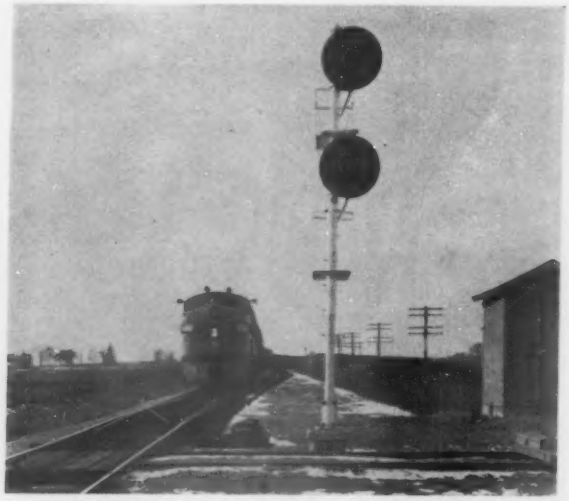
As automobile traffic increased, men operating old-time manual gates had trouble getting the gates down. The gate arms, when down, extended entirely across the roadway; automobiles were sometimes penned in. With the development of unattended gates, worked automatically by track circuits, these objections were overcome by: (1) giving advance warning of the operation of the gate; and (2) cutting off the gate arm so that it obstructed only the right-hand line of traffic approaching the crossing. These ideas were first adopted on the GM&O in 1936, and soon thereafter on the GTW.

The great increase in the wage rate of gatemen since the war has further encouraged the installation of automatics at additional thousands of crossings.

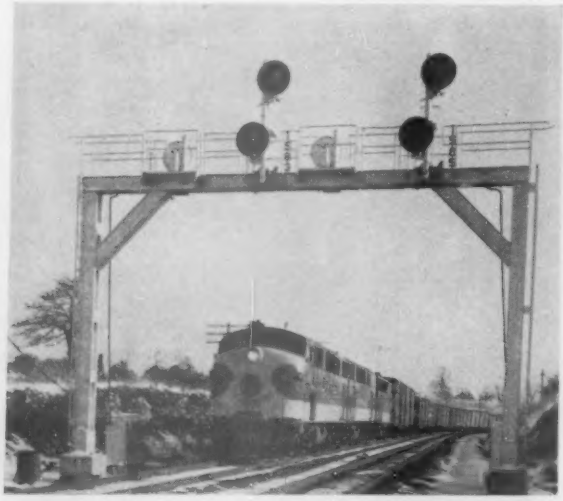




CONSOLIDATING INTERLOCKINGS. New console-type machine will control 14 interlockings in 35 miles of busy, three-track terminal territory.



REDUCING TRACKAGE. "Second main" track was removed, and remaining single track was equipped with centralized traffic control.



GETTING MORE OUT OF TRACKS. Additional capacity of double track is secured by installing CTC with signaling both ways on each track.

Signaling . . .

A LOOK AROUND

Big Programs Under Way

An important activity in the signaling field today is the consolidation of the control of interlockings, especially in terminal areas. One advantage of such projects is that train operations can be coordinated better by one man than by several men acting separately at different locations. The second advantage is a reduction in operating expenses. Circumstances vary, but, on the average, wages for levermen three tricks every day, based on the 40-hour week, and including vacation time, will total roughly $20,000 annually for each interlocking.

The New Haven, for example, has completed 75% of a consolidation of eight interlockings within a radius of 10 miles of New Haven, Conn. Prior to centralization, operation required 46 full-time positions—not including vacation time. Now the job will be done faster by 12 tower operators.

On another railroad, a proposed consolidation of six interlockings on six miles of four-track territory will eliminate 40 towermen's positions.

One-Man Control

The practicability of combining the controls of interlockings has been advanced by recent developments of more compact interlocking machines. The Burlington is working on a project including the control of 14 interlockings on 35 miles of three-track terminal territory, including 17 switches, 70 crossovers and 131 home signals.

This installation is based on a newly developed type of control machine which puts all the controls within reach of a man seated at a compact desk-type machine, about the size and shape of the console of a pipe organ. This development has promise for future consolidations of many interlockings.

Fewer Tracks—More Signaling

With diesel haulage, trains are fewer and are operated at higher average speeds. Track use time is less. Today, given the same gross ton-miles, fewer main tracks than in steam days may suffice. When one track is removed, the installation of CTC on the remaining single track often will provide capacity to handle present-day traffic efficiently. This is being done on extended sections of dozens of double-track railroads.

An associated opportunity is given to increase the capacity of double track—to obviate the need for a third track or to permit removal of additional tracks. By installing double crossover layouts, about 10 miles apart, and by adding power switch machines in centralized traffic control to run trains both ways on both tracks, fast trains are run around slower ones, and all are kept moving without some wasting time on sidings or waiting in the yards. This has been done successfully on ex-

tended mileages on the Rock Island, the North Western, the Missouri Pacific, the Frisco, the Union Pacific and the Chesapeake & Ohio.

Soon after Alfred E. Perlman became president of the New York Central, he said "All four-track main-line will be cut back to double track and equipped with CTC to retain the approximate capacity of present four-track lines."

Such a project is nearing completion on about 180 miles between Buffalo and Cleveland where traffic averages about 85 trains daily.

On 35 miles of the Burlington between Chicago and Aurora, all three main tracks are signaled both directions.

This territory handles 32 through passenger trains, 66 suburban trains, about 24 through freights, and about 100 switching and transfer moves daily.

Automatic Interlockings

Automatic control of interlockings at railroad crossings, where trains approaching on each track all use the same route, has been employed extensively for many years. If trains approaching on the same track are to take different routes at facing-point switches, then selective automatic control is required. This is where modern electronics comes into the picture.

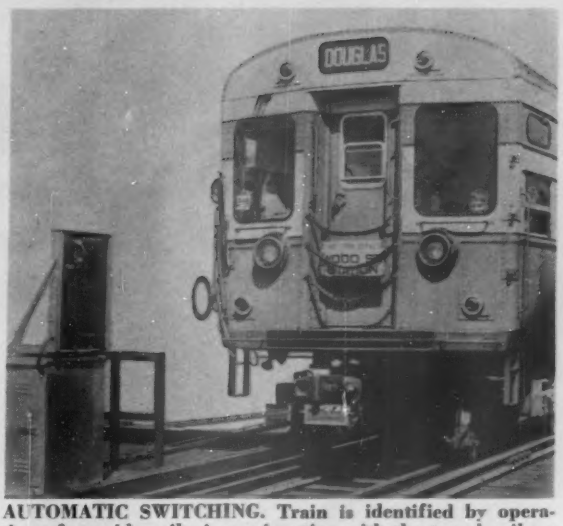
In a system known as automatic electronic train identification, each train carries an inert tuned coil. At each field location there is a fixed coil which is within the field of the coil on the train as it passes. Using such a system, the Chicago Transit Authority installed an automatic selective control of facing-point junction switches in a power interlocking thus dispensing with the services of levermen. This system can be used, where applicable, on trunk line railroads.

Better Crossing Protection

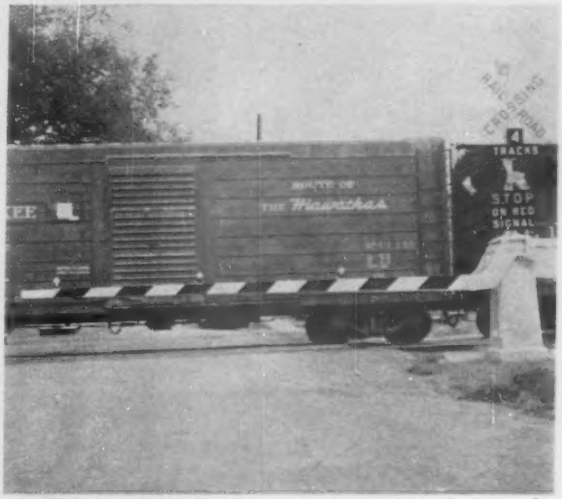
With the increased volume of motor vehicle traffic on streets and highways, part-time protection by watchmen or gatemen is not as effective as in years gone by. Because of the increased wage rates and the introduction of the 40-hour week, along with paid vacations, the annual wage cost for a gateman, round-the-clock, every day at a *single* crossing, totals about $16,000. To obviate such expenses, and to enhance safety, the answer is to install modern, short-arm gates with flashing-light signals, all controlled automatically. The installation of such protection at many crossings in a town may be too expensive. Therefore, in numerous instances, city authorities and railroads are cooperating in closing crossings used infrequently, and installing modern gates, controlled automatically, at the remaining crossings. Such projects reduce the number of accidents and reduce operating expenses.

An objection to automatic track circuit control for highway crossing gates in areas where switching moves or station stops are made has been that highway traffic might be delayed unnecessarily because the gates would be down when no train movement over the crossing was imminent.

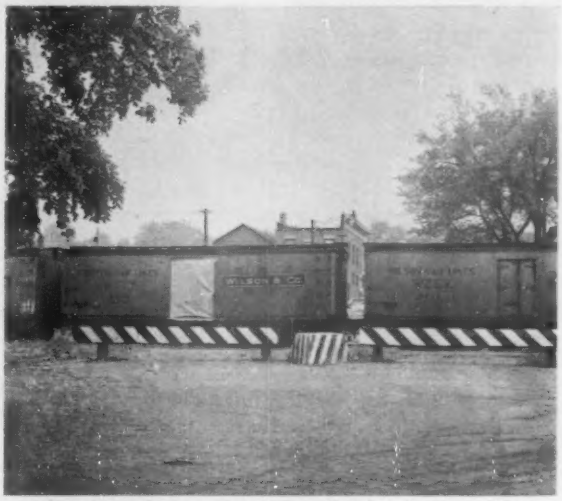
New controls have been developed to cut out the signals and raise the gates when trains stop after entering control sections.



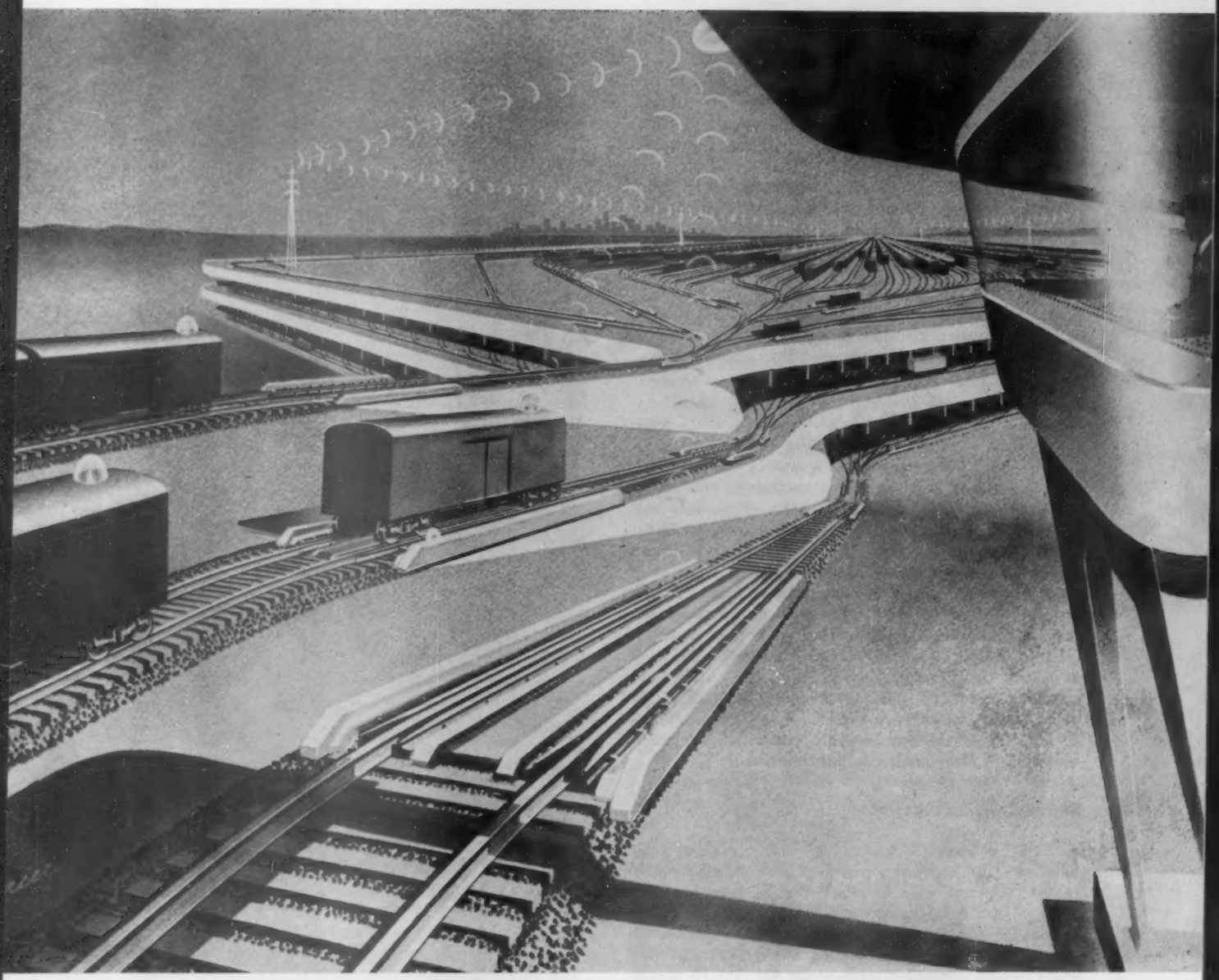
AUTOMATIC SWITCHING. Train is identified by operation of wayside coils, in conjunction with the tuned coil on the left front corner of leading car.



HIGHWAY PROTECTION. Crossings which handle the bulk of the street traffic are equipped with automatic gates and . . .



. . . Crossings that previously handled but little traffic are closed by barriers.



THREE DECKER YARD of 1975—as visualized in U. S. Chamber of Commerce film. The "bubbles" on the freight cars are presumably part of a system for identifying individual cars so they can classify themselves automatically.

Signaling . . .

A LOOK AHEAD

Signaling will be of increasing importance in railroad operations. Modern signal systems, and those now being developed, will be essential in: (1) securing more efficient utilization of diesel locomotives; (2) reducing train time between terminals without further increases in speed; (3) expediting operations in classification yards; and (4) improving efficiency and reducing operating expense for highway crossing protection.

In "Super-Railroads," John W. Barriger says "Modernization of signals and interlockings . . . will represent a major feature of transition to super-railroads." He says that of a realistic overall improvement program for the next 10 years, costing about $20 billion, perhaps $600 million should go for signaling.

More Extensive CTC

Centralized traffic control will be extended on nearly all principal through routes. On multiple track and on busy single track, conventional CTC, including power switches, will be installed. A new type of low-cost CTC system, for light traffic lines, has just been announced. Logically such a system should find extensive applica-

tion on single track not previously signaled, as well as on some sections of single track now equipped with automatic block.

On single-track CTC railroads will install longer sidings, at least twice as long as the longest train, and these sidings will be equipped with track circuits and intermediate automatic signals. Such sidings, with turnouts good for 50 mph, will permit about 75 per cent of the train meets to be made without either train being required to stop.

"An effective CTC installation is more than just a signal system; it is a combination of signals and tracks," observes John M. Pelikan, vice-president of Union Switch & Signal Division of Westinghouse Air Brake Company. "There are several CTC installations on single track which handle from 60 to 90 trains a day satisfactorily. On the other hand, here is a great deal of double track with considerably fewer trains. This indicates that conversion to single track might prove profitable.

"In a double-track traffic control installation, the signaling between controlled switching points should always permit reverse running on each track by signal indication. The cost of such reverse running added to basic single-direction running signaling is small, percentage-wise. Such a system, however, gives the equivalent of long passing sidings and permits closing down one of the tracks during off-hours to enable the use of heavy track maintenance machinery without traffic interruptions.

"We believe that by the installation of centrally operated traffic control systems, together with the use of automatic train identification and train communication, it will not only be possible, but imperative for purposes of better operation and economy, to operate large terminals areas, large multiple track areas, and even whole railroad systems from a central point."

The consolidation of the controls of CTC territories offers much in increasing efficiency and reduced operating expenses. A. L. Essman, chief signal engineer of the Burlington, points out: "The growth of CTC was first started by having small sections scattered over the division, which were later consolidated at division headquarters. Now some projects are being designed to take in more than one operating division. **I feel that the time will come when whole railroad systems can be controlled from one central point."**

Automation in Signaling

Various railroad operations will be controlled automatically in the near future, using equipment and knowledge now available. Freight car identification systems can be applied to all cars in interchange service in the United States and Canada. Thus, trains en route to yards will be checked automatically at unattended outlying locations, and the train list, in exact car order, will be transmitted automatically to the next yard office.

In a discussion of controls for power switches and retarders in yards, A. V. Dasburg, manager yard and terminal development of General Railway Signal Company, defines automation as a "system in which one or more variable inputs are sensed, reported to a central agency where they are evaluated, and the resultant outputs are employed to exercise control or present information in some usable form, without human intervention. Reasoning is not required because man has previously thought out the choices and built them into the system."

Thus, "Look Ma, No Hands" has been applied to the control of retarder yards, and can be similarly developed for other railroad operations.

The future will likely see extensive application of an existing development by which trains approaching interlockings can automatically set up their own routes and clear their own signals—including routes involving selective control of facing-point switches. Other than those destined for a "normal" route, each train must carry automatic identification. A proposal for the future is to apply such an identification system in an extensive area including numerous sizable interlockings used primarily by trains on through routes. The identity of each train, as well as the occupancy of track sections and routes, would be transmitted to a "monitor" control machine for the entire area. Thus one man could effectively operate several large and busy interlockings faster than by the present method of transmitting instructions and changing routes in local manually controlled plants.

Wayside Control of Trains

The use of radio or the inductive system to control the starting, stopping and operation of a train from a wayside station, without action by the engineman, was demonstrated not long ago in Spain and on the New Haven near New York. The latter test included automatic train control to reduce speed and stop the train in accordance with aspects displayed by wayside signals. These demonstrations indicate that remote wayside control of the operation of trains might be possible and safe.

Thus the basic elements for an entirely automatic rail transportation system have been developed by the railway signal industry.

Such a goal is foreseen in a "look ahead," by E. O. Boshell, chairman of the board of Westinghouse Air Brake, in which he finds a requirement for "a new kind of *special* railroad freight service." The basic elements would be specially designed rolling stock and power units. Freight cars would have single axles, automatic coupling, and automatic checking of equipment to decrease maintenance and inspection costs.

"The power units would be small and operated by either one or two people, or in some cases even operated remotely. These units would be equipped with radio to permit pick-up of cars in the most expeditious manner. All signaling would be located in the cab of the power unit, be fail-safe, and continuously indicate the distance from one train to an adjacent train and distances to curves and crossroads. The cabs may have an 'automatic driver,' like the aircraft automatic pilot, to relieve the engineman for long hauls.

"These trains would be made to go all the way from origin to ultimate destination without stopping, except possibly for fuel. At terminal points, special handling equipment would be used to lift loads off the railroad cars and deposit them on the platforms or on trucks ready to carry them to their ultimate destination."

This kind of automatic railroading, according to Mr. Boshell, would create a new kind of service; it would not replace heavy tonnage train movement of bulk commodities in large lots.

A Brotherhood Man Views the

It is my sincere belief that the next decade will be one of the most important and decisive periods that the railroads and railroad labor have ever faced. My conviction is based on two factors of equal significance:

First, the attitude between management and labor has changed to such an extent that in most cases it is now easier and usually more beneficial for both parties to sit down together—not only to negotiate wages, but also to discuss differences of other kinds and mutual problems—like competition problems. Because of this, I foresee gains for the employee in wages and better working conditions. For the employer, I see more efficient and, of course, more profitable operations. I do not wish to imply that labor will not argue strongly for what it thinks is right, of course, just as I expect representatives of management to argue for their beliefs.

But there should be—and I am sure there will be—a meeting of minds that will be of benefit to the employees and increase profits for building up the properties and paying railroad stockholders.

Two-Way Progress

If railroads expect to bring about consolidations, eliminate unprofitable lines, and make longer runs which will benefit them financially, it is vital that they not lose sight of the effect modern methods of operation will have on their employees.

Labor itself, on the other hand, cannot overlook the fact that changes made in established procedures are bound to cause changes in the working schedules of employees. Therefore, concessions will be necessary on the part of both parties in order that the utmost can be realized from any forward steps.

Above all, however, both railway management and railway labor must always remember that the public interest and welfare is the first consideration.

I am sure the two partners had this in mind during the negotiations between the Brotherhood of Locomotive Engineers and the carriers in 1955. I am confident this attitude will prevail in the future.

Second, drastic changes in the conduct of business between railroad labor and management will accompany technological advances, including those commonly called "automation." The railroads were first confronted with this problem 20 years ago when the change from steam to diesel power began to take place.

I have always tried to impress upon railroad workers that progress is something we cannot, and must not, impede.

Wanted: More Skills

But now these questions arise: what happens to the worker as more complex machines come into being and intricate operation becomes greater? What happens to the demand for workers?

It seems to me that as technological improvements are made—as we move into the era of automation—the demand for skilled workers is going to be greater than the supply. Furthermore, the need for education of new employees is going to be greater; every locomotive engineer will of necessity need to be more and more a specialist. It means he must achieve a higher degree of skill in order to handle atomic and turbo-gas-powered locomotives because of greater tonnage hauled, higher speeds attained, etc. There is more to handling long trains, freight or passenger, then the opening and closing of the throttle.

The next decade will see the full force of atomic power being used for peaceful means and the atomic

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CENTENNIALS—NOT ONE, BUT TWO

The Brotherhood of Locomotive Engineers, oldest of the unions of railroad employees, and one of the oldest labor organizations in any industry, was born in a sense the same year as Railway Age—although it dates its organization officially back to 1863. For in 1856 some 68 enginemen, representing 45 railroads in 13 states, met at the Maryland Institute, in Baltimore, and declared themselves the "National Protective Association of the Brotherhood of Locomotive Engineers of the United States." Among other acts, they resolved that "all superintendents and master mechanics . . . be respectfully solicited to give preference to those bearing a certificate from this association—as such are worthy and well qualified." The man elected secretary of this forerunner organization, William D. Robinson, became the first grand chief when the BofLE's parent, Brotherhood of the Footboard, was organized near Detroit, seven years later.

"Worthy and well qualified" for this Centennial Issue, therefore, is a "look ahead" over the next decade by the present chief officer of the Brotherhood of Locomotive Engineers. Neither the editors of this magazine nor most subscribers would agree with everything Mr. Brown has to say, but they welcome this opportunity to read his forecast in public print and most wholeheartedly endorse the tenor of his practical, optimistic outlook for the industry.

Active in railroading since 1909, when he went firing on the C&NW, the author has been grand chief engineer of his organization since June 1953.

Next Decade

By GUY L. BROWN
Grand Chief Engineer
Brotherhood of Locomotive Engineers

or gas-turbo locomotive will become a reality. With the development of such new power will come lighter lightweight and heavier heavyweight trains, as well as greater speeds for all, as a challenge to the railroads.

Some of the railroads are now almost forcing retirement upon employees. It is my opinion that instead of trying to eliminate older engineers, railroads in the future will be looking for methods of keeping these men in service in order to reap the benefits of their training and experience. One big reason for this observation has to do with the changing composition of our population.

The statisticians tell us that by 1970 more than half the population in the United States will be over 45 years of age. Due to medical science, to improvements in surgery, medicine and research, the life span of the average person has been lengthened by 18 to 20 years.

Another reason why the railroads will act to keep their older employees is the ever-threatening possibility of war. No one can foresee when the world might be thrown into a turmoil again as happened in the late 1930's and early 1940's. I believe the railroads do and will have enough foresight to be prepared in their own way for such an eventuality. The railroads should realize that if the older men were out of the picture, it would be impossible for them to get qualified, dependable workers. If this country prepares militarily to offset such a tragedy, the railroads must do likewise by keeping available enough of the older people who would not be subject to military call. It is not only economic sense for the carriers to do this, but also their patriotic duty to see that the locomotives are manned with qualified personnel in the event of an emergency.

We also have the problem of attracting young people to the railroads. There was a time when railroading had a romantic appeal, in the bygone age of the steam engine. However, carriers can no longer depend on the attractions of romance.

How to Get New Blood

The young men of today are more practical than those of us who started our railroad careers 30 or 40 years ago.

They are interested in such things as job security, regular hours, night differentials, premium pay for holidays, and expense allowance when away from home. These are things the railroads do not offer at the present time. To remain on a sound basis they must consider these things during the next few years.

On the other side of the picture, there are rules in most railroad contracts which, because of changing conditions, have become unduly favorable to particular classes of employees and burdensome to the carriers, and which must be revised.

I believe that within the next ten years the demand for qualified engineers will exceed the supply enough to become one of the railroads' top problems.

That is why it is now urgent that firemen be kept on diesel engines. True, a fireman doesn't have as much manual labor to do in present-day cabs as he did during the "good old days" of steam. However, that's progress, and if the railroads want to be prepared for the coming ultra-powerful engines, they must realize the necessity for a man on the left side of the cab—if for no other reason than to train him as an assistant engineer.

The railroads will concentrate on sharpening their competitive strength. Changes in the present-day transportation regulations and ICC policies and interpretations are a "*must*" now, and will be more so in the next ten years, if the country is to obtain the maximum benefit of the inherent advantages of the competing forms of transportation.

For the welfare of everybody, most of the recommendations contained in the President's Cabinet Transport Committee Report must be adopted.

There is a future for the passenger business. There

MR. BROWN: ON THE ENGINEER AND LOCOMOTIVE OF 1966

"What will a locomotive engineer look like ten years hence?

"I think he will have a middle-aged appearance, and will wear white overalls, white, open-collared shirt and white cap, without the familiar neckerchief.

"As for the 1966 locomotive: the exterior will probably be a lot like the present diesels—perhaps a little shorter. The ultra-high-powered engine—either atomic or turbo-gas-powered—will be much more compact and will take up much less space than present-day diesel engine housings."

is no way by which the railroads can compete with the air lines on speed, of course. However, I think that if the railroads continue to stress *comfort* for their passengers—as they have been doing recently—in the next 10 years they will be operating this portion of their business more profitably.

Each year our standard of living is higher. Most Americans are interested in taking better and longer vacations and as their vacations get longer, the average family with a strong love for this great country will want to see more of it. Already the bus companies are building larger and more comfortable buses to make travel by that mode more pleasant. (Of course, they have the advantage of being able to use highways which were built by local, state and federal funds, some of which are taken from taxes paid by railways and their employees.)

The railroads can meet this challenge only by offering more luxury and comfort in their travel. They have surpassed the buses in this respect and can continue to do so.

Among the things which are adding greatly to the railroads' progress are family rates and increase in courtesy to the customer by the railroads' employees. The modernization of railroad stations also enters into the picture. However, I have always stressed the fact that improvements cannot be limited to equipment. Roadbeds are important, they must be constantly renovated and improved to complement the characteristics of the modern lightweights.

Yes, I am optimistic about the next ten years in the railroad industry. I see no place for this business to go but ahead under the leadership of such forward-looking men as Tuohy, Young, Russell, Gurley, Stoddard, and others of their caliber.

The railroads are the backbone of the transportation industries of the United States and Canada. They will move ahead.

Ayes and Nays for Mr. Brown's "Look Ahead"

—BY RAILROAD PERSONNEL OFFICERS

". . . will require some basic changes in operating methods and techniques"

"While I cannot agree with all of Mr. Brown's views, I think he has provided an interesting analysis of the situation of the railroads and their employees. I heartily second his optimistic predictions for the future of the railroads, and agree with his remarks on the vital need of cooperation between railroad management and the railroad brotherhoods in meeting the challenges of today and the future.

"I am glad that he has emphasized the need of meeting the competition which faces the railroads from several sources—and which will require some basic changes in operating methods and techniques."

—J. W. Oram, vice-president—personnel, Pennsylvania

". . . agreements with labor . . . are too complicated . . ."

"Grand Chief Engineer Brown's article is interesting and challenging. It is of particular interest to me because, as I recall it, the first agreement made with the Brotherhood of Locomotive Engineers was with the Mohawk & Hudson, a predecessor of the Central, somewhat more than three-quarters of a century ago.

"Like Mr. Brown, I foresee the time ahead, and I hope immediately ahead of us, when there will be a great improvement in the relationship between the labor organizations which represent railroad employees, and **that other group of railroad employees sometimes referred to as the management.**

"Unless this is so, we may well see the time when we shall prove the truth of that old warning—'we must hang together or we shall each hang separately.'

"Railroad employees have more to gain from the prosperity of our railroads than anyone else on earth —more even than the people who own the railroads—because in few industries is the ratio of wages to income so high.

"Our agreements with labor in the railroad industry are too complicated and far too much time is wasted by the parties over claims and grievances arising out of the interpretation of those agreements. They must be simplified.

"I hope too, that we shall see an improvement in the relationship between the many labor organizations representing railroad employees. Today many of our claims and grievances arise out of the rivalry between the organizations or between committees of the same organization on the same railroad. Frequently the railroads are in the middle.

"I agree with Mr. Brown that the great wealth of experience of older employees is a valuable asset of the railroads. I do not, however, view the retirement of employees at age 65 (it is later in most cases) as a handicap to the industry. It is

probably true that the average age of railroad employees is higher than in almost any other industry of comparable size. The experience and skills of these older employees should be utilized to good advantage beyond the performance of their immediate tasks. They are needed particularly for the induction and training, and recruitment, of new employees.

"The railroads of the future will be just as good as the men and women who operate them. Along with new machines, electronic devices, new methods and procedures, must come an improvement in the skills of our people.

"The labor organizations should help afford employees every opportunity to improve their skills. The real hope of railroad labor for improving wages and working conditions lies in increased productivity.

"I see a great future ahead for young men in the railroad industry —if they have the right basic education and potential skills. Those of us who make labor agreements should give the industry a better chance to develop these young people—by relaxing seniority and other rules of our agreements so as to permit giving younger employees a wider variety of experience on jobs. This freedom is essential to the training of a well-rounded railroad man.

"A widening of seniority districts would be good. It would make for greater stability of employment. It seems foolish indeed, and wasteful, to furlough experienced railroad men in one district when business declines, while having to hire inexperienced men and women on another district a few miles away."

—L. W. Horning, vice-president—personnel, New York Central

". . . an intermediate depository for customers' dollars for . . . employees"

"While I do not agree fully with Mr. Brown on everything, his statement that 'both railway management and railway labor must always remember that the public interest and welfare is the first consideration,' is an outstanding observation.

"I think there is an increasing awareness by some of the organizations' representatives that the railroads no longer have any monopoly on transportation. More general chairmen are recognizing that the railroads are a kind of intermediate depository for customers' dollars for subsequent distribution to employees. Many of these representatives recognize they must satisfy the needs of the public to provide the funds necessary to provide the improvements they seek for the employees. More and more realize that a satisfied public provides the funds to keep employees satisfied.

"Many of management's problems are created by unskilled labor negotiators on both sides of the table who fail to consider the public interest.

"High-salaried skillful management personnel is spending too much time on trivial labor matters. Release of this time can provide the energy to solve competitive transportation problems—which would be mutually advantageous to both employees and management."

—C. A. Pearson, assistant to the president—personnel, Great Northern

Likely Issues in Collective Bargaining

The author of the recent book *Collective Bargaining in the Railroad Industry* raises questions about:

- **Greater affiliation with CIO-AFL**
- **Growth of railroads vs. growth of economy**
- **The issue of working agreements**

By JACOB J. KAUFMAN
Associate Professor of Economics
Pennsylvania State University

Social scientists differ among themselves as to the interpretation of the past. These differences are magnified when they are asked to predict the future. To attempt to predict the state of labor relations in the next decade would be foolhardy.

Nevertheless, an understanding of current problem areas and of factors which should be taken into account in attempting to analyze the future can be helpful.

More AFL-CIO Affiliation?

The first question which comes to the minds of most railroad people is: What effect will the recent AFL-CIO merger have on the railroad labor movement? What are the chances of affiliation with AFL-CIO of the four independent operating unions?

The fact is that virtually all of the non-operating employees are members of labor organizations which have been affiliated with the American Federation of Labor, now the AFL-CIO, for many years. But the situation among the operating employees is quite different. The Switchmen's Union of North America has been affiliated with the AFL-CIO for 50 years. The Brotherhood of

(*Continued on page* 341)

A LOOK BACK

In 1865, one Amasa Stone, who had bought from its inventor the patent rights to the famous Howe bridge truss, constructed at Ashtabula, Ohio, the first Howe truss railroad span of a then new and revolutionary material—wrought iron.

But regrettably Mr. Stone had little knowledge of bridge design. On a snowy December night in 1877, the bridge collapsed under a passing train, resulting in the death of 90 persons. The railroad's chief engineer, grief stricken by the tragedy, committed suicide. The coroner's verdict placed the blame directly on Stone's design. The resultant furor in railroad circles brought about the realization that specialists were needed in the field of bridge design.

During the 1870's and 1880's, American railroad bridges were failing at the phenomenal rate of 25 per year. Then and there was inaugurated a new era in bridge building—specialization, research, scientific design, careful detailing, thorough inspection and testing, and a new material—steel.

The first known use of steel in railway bridge construction was in the triple-span Eads bridge at St. Louis, completed in 1874. Prior bridges had been constructed from wood, stone, iron, cast iron, and wrought iron. With the development of steel as a bridge building material came an evolution in truss design. The unsightly 19th century iron trusses were evolved into forms of grace and beauty—the modern arch, cantilever, continuous truss and suspension bridges. As bridge design was perfected, loading was continually on the increase. Heavier locomotives and rolling stock and longer trains were pounding harder and harder at bridge structures.

The beginning of the 20th century saw the end of building great, massive stone arches. The age of concrete had arrived. In 1910 plain concrete bowed out of the picture in favor of steel reinforced concrete. The year 1916 saw completion of the great Tunkhannock viaduct on the Lackawanna. A stupendous achievement for its time, the structure consumed some 162,000 cu yd of reinforced concrete.

The advancement of framed structures after the turn of the century was marked by the advent of steel arch construction, illustrated in the Hell Gate bridge at New York—completed in 1915.

The Eads bridge, among other innovations, had made the first use of alloy steel in bridge construction—a material providing greater strength and less dead weight. This material was used extensively in the years that followed. Many great bridges were built between 1910 and 1935—too numerous to mention here. Rolling processes made possible the plate girder spans which came to replace many of the shorter truss spans. Ballasted-deck bridges provided reductions in impact, fire hazard and maintenance, with improved riding qualities.

Bridge maintenance, ever a burden, became a very real problem during the 1930's. In searching for means to reduce maintenance costs, it was found that many spans —particularly the shorter ones—could be filled in using the heavy earthmoving equipment then being developed. Culverts were provided in many fills to handle the flow of water. Beginning in wood and stone, culverts, too, changed in material with time as had their more majestic counterparts. Cast iron pipe, concrete pipe, concrete boxes and, later, corrugated metal pipe made their appearance. Welding as a bridge maintenance tool made its appearance in 1927 on the Chicago Great Western span across the Missouri at Leavenworth, Kan. Power maintenance tools, first introduced in 1916, improved in design.

Meanwhile, many old masonry bridges, built to last "forever," began to bow before the ravages of nature and heavy traffic. Pressure grouting was developed to check their deterioration and that of many bridge piers. Paint and corrosion inhibitors were brought out to check the deterioration of steel bridges. First brushed on and later sprayed, these materials aided considerably in the reduction of corrosion due to brine drippings.

Use of creosoted piling for wood trestles was introduced in 1916 and consistently expanded. Fire retardant materials and improved methods of wood preservation came into use. Some railroads began to replace timber bents in their trestles with concrete pile bents.

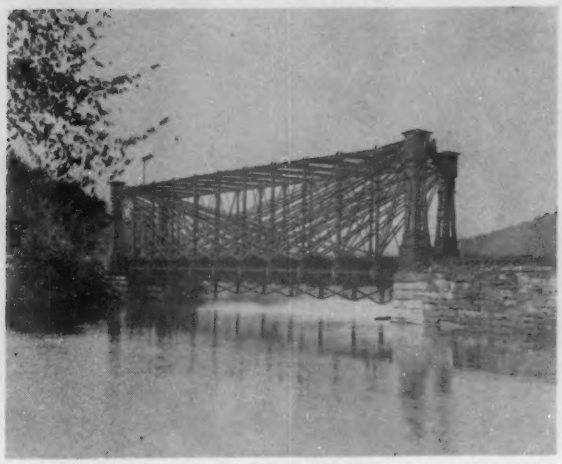
Building Trends

While the bridge designers were busily solving their many problems, the architects and building people in the industry were busy too. Beginning with the log cabin, railroad buildings—especially stations—progressed to eventually show great contrasts. In the heavily populated metropolitan regions great, ornate "palace-type" stations were built. Costing millions of dollars, they served the same passengers as did the rural stations. The latter, however, were far from ornate. Often costing only a few hundred dollars, they were built to provide only the bare necessities.

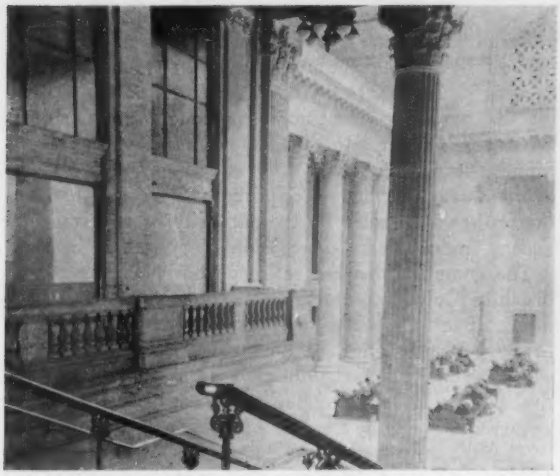
As competition increased, however, the railroads became more and more conscious of the need for providing better service to their patrons. The dingy, poorly maintained on-line station buildings began their exit. Station by station, replacement and modernization was begun. New materials—concrete, steel, asphalt, glass—were incorporated. Lighting, heating and landscaping were improved. Air conditioning entered the picture. Many of the old, large terminal stations, too costly to replace, were revamped inside and out—bringing to the public the "modern look" on the industry.

Service buildings, meanwhile, were forced to undergo extensive remodeling also. As the steam locomotive bowed to the advent of diesel power, roundhouses, water towers and coaling stations gradually left the scene. In their stead were built modern diesel servicing shops. Freighthouses, worn with age, were rebuilt incorporating the latest in materials handling equipment. Improved architecturally and functionally, railroad structures began to advance the "better-service" theme.

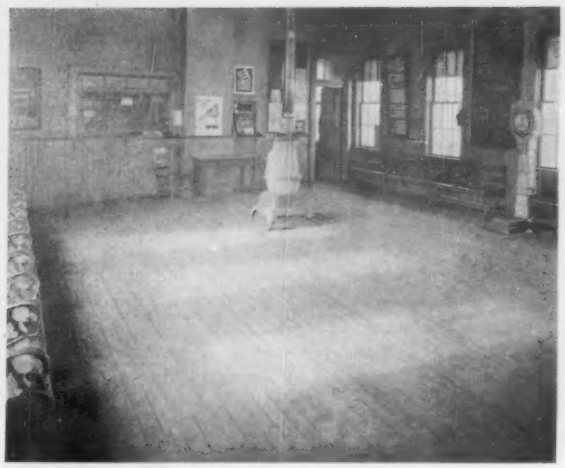
20th CENTURY bridges—forms of grace and beauty—were evolved from . . .



. . . 19th CENTURY iron trusses such as this one at Harper's Ferry, W. Va., built in 1866.



PALATIAL passenger stations were the vogue in the larger metropolitan centers. At the same time . . .



. . . DINGY, unpainted and poorly heated frame stations served the rural areas as community centers.

Structures . . .

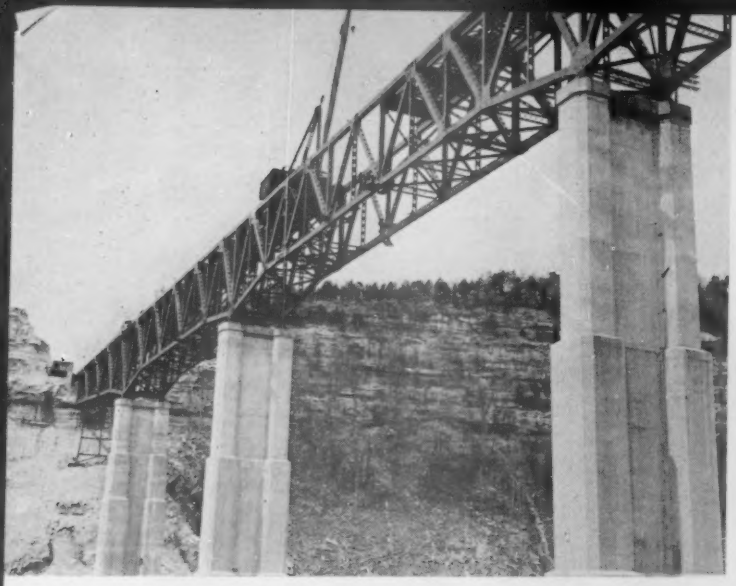
A LOOK AROUND

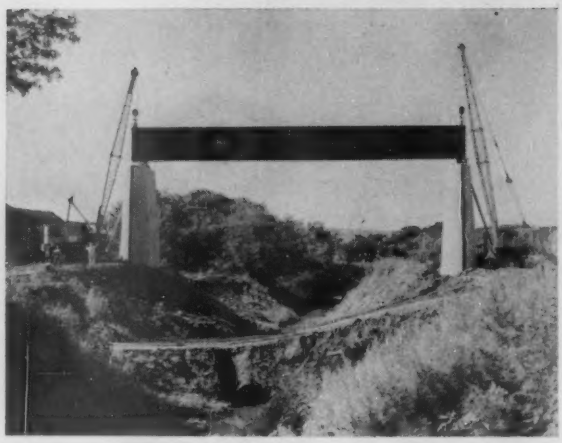
Most of the steel bridges in use today were built in the age of steam power. As locomotives of that type grew in size and weight, bridge engineers were hard-pressed to provide structures of the required capacity. Where they have the resources in money and materials to do the job, speed restrictions had to be imposed over individual structures until the situation could be corrected. Weak structures were eliminated either by building a new bridge or by reinforcing the existing one, which was usually done by welding additional plates and shapes to the old members.

When diesel power came in the constantly increasing weight of locomotives was no longer the prime factor, and almost for the first time the bridge engineer could concern himself more with refinements in design, and with the achievement of beauty and grace. No longer is he preoccupied constantly with the problem of how to make bridges continually stronger.

Aids for the Bridge Engineer

In the new era the bridge designer had a greater range of tools at his command for putting economy and beauty into his creations. Here and there one was found who was willing to pioneer in the use of welding for fabricating new structures. Some began to use high-strength alloy steels for girders where members of carbon steel would have been of excessive size and weight. A more recent development has been the discovery that high-strength bolts offer advantages over rivets under some conditions. And a variety of coatings had become





NEWS IN BRIDGES **Bridges are built these days with an eye to beauty. Stepped-prism design concrete piers enhance appearance. Railroad lines are now being built without waiting for the track. Spans are hauled in by truck and erected by crawler cranes.**

available for protecting metal bridges from corrosion.

H-section and tubular steel piles came into the picture and were soon being used widely for bearing piles and in the construction of piers and bents. The reinforced concrete pile, precast or poured in place, then made its appearance, and soon the concrete pile trestle, supporting deck slabs of reinforced concrete, was displacing the timber pile trestle on some roads. Modern methods of preservative treatment have given timber a high degree of permanency, however, and much progress has been made in devising means for protecting such structures against fire.

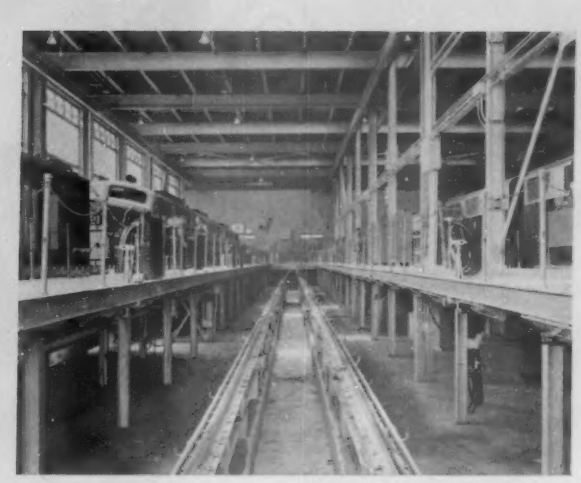
Trestles, and other types of bridges, too, are being displaced on a large scale by the earth fill. Many bridges in existence today were built when it was cheaper to bridge a valley than to build an embankment across it. Modern grading equipment has brought about a reversal in this cost advantage. As a result, many railroads have undertaken programs to fill trestles and other bridges, installing culverts to handle the water flow.

For a long time the requirements for new railroad bridges have been confined largely to replacement of existing structures. But a development is now occurring that is requiring construction of many new bridges. Wherever a railroad crossing occurs in the nation's rapidly expanding network of superhighways and expressways a bridge is required. When this happens the project is handled by the authority or governmental agency under whose supervision the highway is built.

The complications the railroads have encountered in providing suitable buildings have, in some respects, been more acute in recent years that those involved with bridges. The function of the bridge has remained the same, but one whole class of railroad buildings—locomotive shops and servicing facilities—has practically been rendered obsolete by the diesel locomotive.

The old-fashioned roundhouse, designed specifically to serve the needs of single-unit steam power, was not suitable for handling diesels. Structural alterations could be made in roundhouses to adapt them for diesel power,

CONCRETE AND TIMBER **Concrete pile trestle with precast concrete slab decks is now used extensively on some roads. Timber trestle is still used where economical. Life expectancy has been enhanced by preservative treatment of the wood and other techniques.**



MOTIVE POWER SHOPS The diesel has required a facility tailored to its characteristics—precision, cleanliness and protection. Accessibility marks today's inspection areas. Diesel shops provide depressed working levels alongside pits and platforms at cab-floor level.

but even then the arrangement was far from ideal. Some roads performed major surgery on their old enginehouses when they went to diesel locomotives, but the majority chose to erect new shops specially designd for the new power. The passing of the roundhouse has also meant curtains for the turntable.

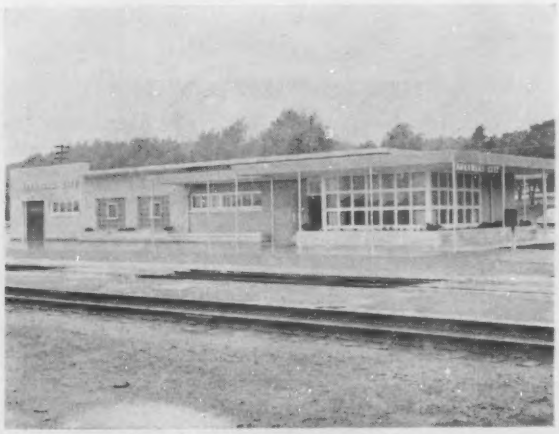
Upgrading Passenger Stations

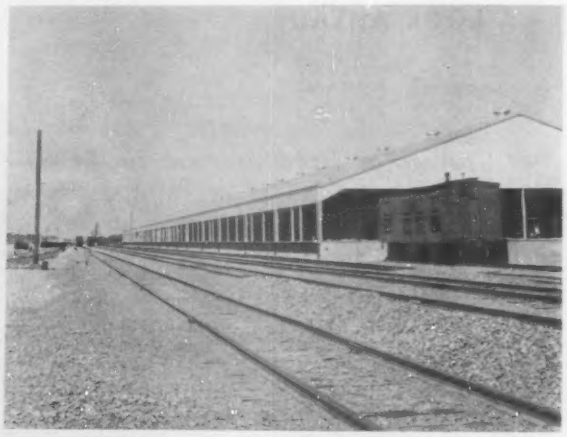
Gone too, on most roads, are other landmarks of the steam era—the coaling station and the water tank. Many of these structures have been dismantled and sold for scrap. In their place are fuel oil storage tanks, small treating plants to produce the limited amounts of water required for diesel cooling and flash-boiler systems, and servicing platforms where diesel locomotives are processed pretty much the same as are automobiles at gasoline servicing stations.

While present levels of passenger traffic put no strain on the capacity of passenger stations, change has nevertheless touched this category of fixed property. Passengers today have different needs. They do less waiting and more hurrying direct between taxi and train.

Structures that are pleasing—even striking—in appearance are good advertising. Even in localities where railroad passenger business had dwindled almsot to the vanishing point, city fathers are not hesitant in insisting that the old railroad station be replaced with a structure comparable in appearance to the newest supermarket down the street.

Railroad architects and building engineers have met the challenge. Where the old stations were structurally sound they have been transformed into modern, attractive buildings by the use of an infinite variety of structural and decorative materials, chosen for permanency as well as appearance. Where the old structures were totally inadequate, they have been replaced with new buildings. In both instances the resulting structures demonstrate that railroad architects have made a complete break with traditional forms of railroad architecture.





FUNCTIONAL DESIGN Modern passenger stations are functional and attractive. They de-emphasize the "waiting room" and accent speedy transfer between train and street vehicle. Prefabricated metal buildings are used widely for railroad structures, large and small.

ALUMINUM SPAN is swung into position on Alcoa's Massena Terminal. This 100-ft span, the first ever installed, saves 75,000 lb in "dead weight" and will furnish bridge designers with valuable information.

Structures . . .

A LOOK AHEAD

New materials a-borning are key to future of fixed railroad facilities—plus new ways of assembling them, like automatic welding

To look into the future of railway structures we must first, as is often the case, look back. In this instance, back to 1946 when, near Massena, N. Y., the first all-aluminum railroad bridge span, 100 ft in length, was placed across the Grasse river. This installation gives an insight into what may well be the key to the future of railway structures—*materials*.

First, let us concern ourselves with bridges. What new materials loom on the horizon? Aluminum, too costly at present, seems to possess adequate strength. As is the case with all new developments, much research and testing needs to be done and many technical problems have yet to be solved before it will gain even limited acceptance. It will have to be possible, for instance, to roll aluminum in large structural sections.

Alloy steel, now used quite extensively will probably find even greater application in the years to come. Here too, high cost often injects a prohibitive aspect into the present-day picture.

Can a steel be produced having all the desired qualities of strength and yet possessing complete corrosion resistance? Such steels are available now—the so-called stainless steels—but their cost, especially in structural

sections, is prohibitive. But how about present high-strength alloy steels clad with a "shell" of corrosion-resistant, or stainless, steel? Production of such a material would present a multitude of problems.

However, if those problems can be solved and if the price can be brought to a reasonable level, the railroads will find many uses for the material in their structures.

Insofar as timber bridges and trestles are concerned, there are now chemicals under development which, applied during the preservative process at the timber plants, will render bridge timbers and piling virtually indestructible by fire.

More Welded Bridges

Materials are the key to the future of railway structures, but methods—new ways of doing things—are of almost equal importance. The AAR's G. M. Magee has predicted that welding will advance to become, perhaps, the major method of bridge fabrication in the future. Pointing out that all-welded construction permits more efficient utilization of the steel, more efficient joint construction and unlimited attractiveness in design, Mr. Magee went on to say: "I believe that, with increased knowledge of welding techniques, strength of the welds, and utilization of automatic welding procedures, all-welded construction of new bridges will be the general practice."

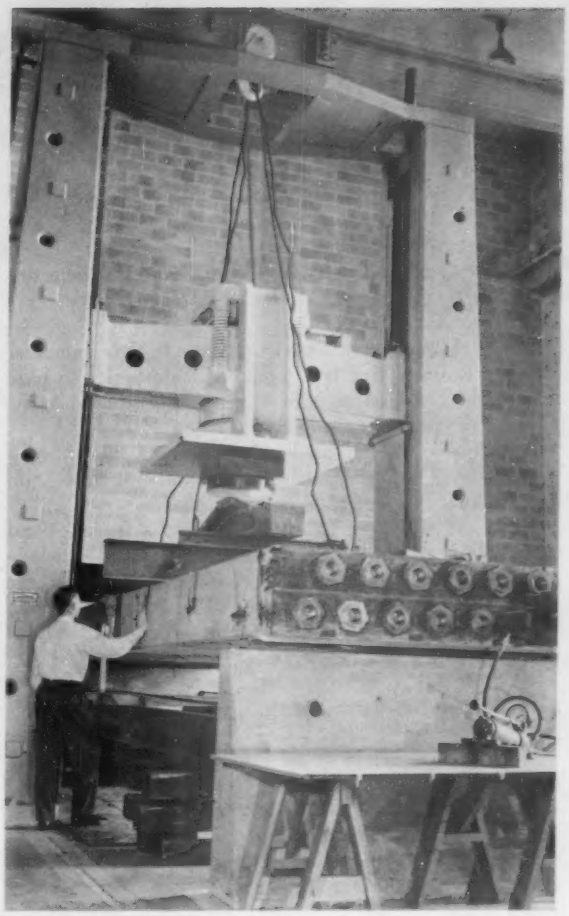
Versatile Building Materials

Railway buildings today contain practically every type of material known. It is safe to assume that as new metals, plastics and other materials are developed, they, too, will find their way into improving the serviceability and attractiveness of stations, freighthouses, diesel shops and other buildings.

In passenger stations, we may expect to see more and more installations of devices designed to attract the public and ease the process of boarding and leaving trains.

"Moving sidewalks," some of which are now in use, will become more common, as will escalators. Air conditioning is already becoming almost mandatory. Comfort and service—two ideals being aimed at today—will reach an optimum in the stations of the future.

Service buildings—shops, freighthouses, and such—will respond to the call of progress with more and more mechanization. Automation, now a partial reality, may well become almost complete in the handling of freight, mail, express and baggage.



RESEARCH in new materials and methods is being carried on constantly. Testing of the prestressed concrete slab shown here will furnish data for improved structures.

ALL-WELDED structures like this trans-turnpike span may well be the forerunners of an economical and highly efficient bridge design of the future.

A Customer Looks Ahead

By A. G. ANDERSON
General Traffic Manager
Socony Mobil Oil Company

For every railroad man in the United States there are probably two laymen who consider themselves experts on how to run a railroad.

Althought the invitation to contribute to the Centennial Issue of Railway Age is a tempting opportunity to pose as an expert, I wish at once to qualify myself. I know nothing about running a railroad.

As a user of railroad services and of other transport agencies, I shall restrict myself to observations on how the railroads can meet future needs.

The next ten years promise to be the most critical of the many trying times in railroad history. The growing demand for speed and flexibility which the motor carriers and air lines have been able to supply on many classes of traffic cannot be met by railroad operations based on traditional techniques.

Problems—But Stimulating

That motor carriers of the future will be able to serve the shipping public with even greater abilitv is promised by recent legislation authorizing a $33 billion, 13-year federal highway program providing 41,000 miles of interstate highway—linking most cities of more than 50,000 population into an integrated system of high speed roads.

This program is already in high gear. It and other pressures will make railroads' task of building traffic more difficult.

With these difficulties, however, I see opportunities.

The manufacturer, the farmer, and the consumer are interested inherently in reducing transportation—both as to time and cost. In a free economy, their efforts are directed toward increasing production and consumption at a minimum cost of distribution.

During the past ten years, problems of production have been solved with amazing rapidity—resulting in higher productivity per person and a substantial increase in "gross national product." Since 1946 industrial productivity per worker has increased at the rate of 2½ to 3% a year.

During the same period G.N.P. almost doubled—the next ten years will witness a continued growth in productivity.

Stress on Distribution

Along with it, I foresee greater strides in improvement of distribution efficiency. No longer will industry rest content with presently available methods of handling goods, of transporting them from existing plants to existing markets, of distributing them to individual consumers. Distribution analysts will study the entire economic structure to find that combination of plant location, handling methods, and transportation means which will create the most economical distribution pattern.

Put into action, these plants will create new communities, new markets, new movements of traffic. This is fraught with significance for the transportation industry, for while it may greatly alter existing traffic patterns, at the same time it will create opportunities for new freight and passenger movements where none now exists.

During the past ten years, for example, there has been a phenomenal population and industrial growth in the eleven western states. Branch plants of industries formerly concentrated in the central and eastern production areas of the United States have been strategically placed throughout the Mountain-Pacific region to accommodate the tremendous postwar demand there for manufactured goods—avoiding the need for long-haul transportation.

Many new industries likewise have located in the Gulf Coast area, availing themselves of low cost water transportation facilities. Cheap electric power at many places has been directly responsible for further industrial dispersal.

Each of these factors has reduced the length of haul formerly required for moving commodities and products from raw material sources to manufacturing sites and from there to points of consumption.

In many industries this tendency has already progressed far. The automobile industry now manufactures automobile parts centrally but assembles them in decen-

The Author...

Andrew G. Anderson has spent his entire business career in industrial traffic management, including association with producers of cotton oil and aircraft.

Since 1926 he has been associated with Socony Mobil (or predecessor companies) and he has been general traffic manager of that organization since October 1944.

During World War II the author was furloughed by Socony Mobil and served as general manager of supply and transportation of the Petroleum Industry Committee of the Petroleum Administration for War (District I).

Mr. Anderson is a member of the board of directors and executive committee of the Transportation Association of America and chairman of the American Petroleum Institute, Central Committee on Railroad Transportation.

He is a past president of the influential National Industrial Traffic League whose membership, it is claimed, ship or receive from 75 to 80% of the intercity freight traffic of the country by all forms of transportation.

"Let us assume that it is possible to solve terminal car handling problems and render the handling of individual freight cars commensurate with modern speeds of freight trains.

"Let us assume further that it will be possible to provide a modern freight car fleet capable of being loaded and unloaded rapidly by mechanical equipment and of carrying freight safely.

"The railroads would then be in a position to create and develop actively new freight traffic. In service and ability to carry volume quantities they would be in the forefront of all the transportation agencies."

tralized plants near market centers. The chemical industry, which shipped few of its products in bulk in 1946, today transports more than 250 varieties of liquid chemicals by tank truck and tank car. The petroleum industry builds new refineries more economically situated and abandons those in less advantageous localities.

For example, Socony Mobil's new refinery at Ferndale, Wash., has changed the entire distribution pattern of both its crude oil and petroleum products in the Pacific Northwest. Rail movements of petroleum products from California, Wyoming and Montana to Oregon and Washington have practically disappeared and have been replaced by new movements via water, pipelines and tank truck from Ferndale to Oregon and Washington markets. This is also true of several other oil companies which market in the Pacific Northwest.

Shifting Traffic Channels

Since World War II each transport agency—railroad, motor, water and pipeline carrier—has been engaged in a titanic struggle with the others for what is known as its "share" of the traffic.

If what I have outlined as the tendency of the future is valid, the assumption on which this struggle has been based—namely, that there *are* such phenomena as permanent movements of "traffic" to be shared—is false. The next ten years may see the disappearance of much present traffic and the creation of new traffic.

Unless the railroads are awake to the opportunities created by these changes in distribution patterns, their existing traffic may dry up and vanish—while other transport agencies seize the main chance to open up new channels of traffic flow.

Competitive Tools

Speed of movement will be more important than ever in the next decade. Since 1935 the development of diesel locomotive power has boosted the speed and efficiency of freight trains tremendously. Nevertheless, as John W. Barriger points out in his book "Super-Railroads," we users are not concerned with *train* performance but with *car* performance. It is rightfully a matter of pride to a railroad that 100-car freight trains travel at 50 mph. The shipper gets no benefit, however, if his car on that train goes 400 miles in 8 hours—but takes 8 days to deliver.

It seems probable that the next ten years will see even further developments in motive power. Generation of electrical power through atomic energy may make feasible a renewal of the electrification program which was retarded with the advent of the diesel-electric locomotive. Perhaps train-drawing power will be doubled in that period.

But, until something is done to improve the time in transit of individual carload shipments, the railroads will not be in a position to create new traffic out of changing distribution patterns.

In my opinion, the railroads are—and must be—able to provide three day service on transcontinental traffic between the coasts. Of course, every little town and hamlet cannot get freight service equal to, say, the "Century" or the "Broadway." I am convinced, however, that railroad freight service between all of the key cities must be on a par with a three-day transcontinental schedule; that is, one-day service between major cities 500 to 1,000 miles apart.

Revolution in Car Design

Speed in transit alone will not bring new traffic to the railroads, however. Great improvements must be made in freight car design, in adaptability to modern mechanical handling methods, in devices for protection of lading, in ridability of cars.

Such cars can incorporate all these features and still be lighter in weight than existing equipment. Railway car designers have not been faced with the weight limitations which have encouraged designers of highway

BIG GROWTH AHEAD—

IF RAILROADS PROVIDE FACILITIES

In the next ten years population is expected to grow 17% and industrial productivity, 34%. By 1965 energy requirements will increase by some 33%. Nearly 83% of that energy will be supplied by solid and liquid fuels —fuels that must be transported to be used.

This means about 30 million more people to consume at a greatly increased rate per capita. It means whole new communities, new types of goods and new methods of distributing them, increased transportation of energy-producing fuels.

To the railroad industry it means new vistas of traffic potential, *if* the challenge of adequate facilities is met. The nature of the challenge is not that of holding the traffic or regaining the traffic lost to competitive modes; the challenge is to *create traffic*—traffic which does not now exist, but which will be born of new distribution needs.

While the public highways of this nation groan under the load of unprecedented motor vehicle traffic, the railroads have at their command thousands of miles of *under*-used private "highway"—all of it interconnected so that a car can be moved from any point to any other point on the railroad system. Even during World War II, with its extraordinary demand on the railroads, this integrated system of rail "highways" was not used up to its line trackage capacity.

equipment to improve carrying capacity per pound of vehicle.

Yet, if railroads are to meet the challenge of speed, they too must make every effort to design light but strong railroad cars able to maximize the ratio of payload to dead weight. A good start in this direction has been made with passenger equipment.

So long as shippers must continue to fortify carloads with heavy timbers, gates, and tie-downs—as if they were going to war—they will be inclined to avoid difficulties now encountered when they choose rail transportation—by using motor carriers. Furthermore, delivery of freight in a battered condition in spite of all precautions will almost assure rejection of railroad service by the shipper of freight. **Radical improvement in freight car design is a must, if rail carriers are to be competitive.**

To make rail freight service complete, movements cannot be restricted to those customers who have track facilities for shipping and receiving carload freight. There should be integration with highway and water services so that railroads will be free to accept and deliver freight that must move by other means to and from consignees and shippers not served directly by rail facilities. The old method of transferring small packages, piece by piece, from truck to car and back to truck at the other end of the trip will not meet the needs of the next decade. Terminals must be developed so that large unit loads can be transferred quickly and efficiently from truck to car, either directly or through modernized freighthouses.

The recent spurt in the development of "piggyback" service is promising, but "piggyback" is not the only method of interchange between railroad and highway. Perhaps, it will not be the most efficient ten years hence —when better methods of transferring something less than whole trailers between rail and highway will have evolved.

In spite of the rather prevalent theory that passenger service is a losing business, I am convinced that freight service revenue can be augmented considerably by adapting passenger facilities to the kind of transportation railroads can do best. On trips too long for comfortable driving or bus travel, and too short to be appropriate for air travel, there is a wide area in which railroads can furnish the safest, most comfortable transportation—and profitably, too. Even where air service is faster, many are the travelers who prefer modern de luxe railroad coach trains—like the Santa Fe's "El Capitan." I understand many such trains average 40 passengers per car. A 20-car train of this type will yield 800 fares—which is a profitable operation.

Contrast this with the poor economies of sleeping cars, which average about 12 passengers per car. In fact, I predict that within ten years the old-style Pullman car will be practically a relic of the past.

Nor do I see any future for railway mail transportation. The speed of air mail and the flexibility of truck delivery render rail transportation of mail inefficient in most instances and unsuited to the speed of communication demanded by modern business.

Let the railroads relinquish the longer-haul and Pullman traffic to the air lines. To abandon the opportunity, however, to develop the potential de luxe coach market is a disservice both to the public and to the railroad stockholder—who would waste an available use of his investment in basic railroad plant. It is my firm belief that the railroads will not miss this opportunity.

The resurgence of railway transportation during the next decade, it seems to me, depends on a new approach to the generation of traffic and a firm determination to overcome the considerable inadequacies of rolling equipment and methods of handling individual shipments. If the railroad industry will look ahead sincerely and vigorously, it has a unique opportunity to create traffic fitting the needs of the expanded economy promised for the next ten years.

Roadway . . .

A LOOK BACK

Visualize something that is basically the same as it used to be—but at the same time drastically different. Such mental gymnastics are necessary when tracing the development of railroad track.

Within a relatively few years after the first railroad was built in this country the track structure had evolved into its traditional form—metal rails supported on and fastened to wood crossties. Efforts to improve on this basic concept have failed, but the details of construction and carrying capacity are vastly improved.

Track engineers have labored under the tyranny of three unrelenting masters. The most demanding of these, probably, was the constant need for making the track stronger to carry equipment that never seemed to stop growing in weight and speed. The other two were the equally constant need for economy of maintenance and for safety in train operation.

To serve these masters, the track structure has undergone a process of steady strengthening and refinement —a process marked here and there by "break through" developments that opened up new possibilities for achieving strength, safety or economy, or all three at the same time. These developments included:

Introduction of the T-Section Rail—When Stevens, about 1830, whittled out of wood his conception of an efficient rail section he hit upon a basic shape that has since proved by mathematical analysis and scientific research to provide the most efficient method of transmitting loads from flanged wheels to crossties. In their efforts to meet the demand for a stronger rail section, engineers have introduced important refinements in Stevens' design and have enlarged it as wheel loads have increased, but they have not altered the basic shape.

Preservative Treatment of Crossties—Probably no other single development has contributed so much to economy of track maintenance as the practice of treating crossties with toxic materials to prevent decay. In the beginning only untreated ties, with a life of 3 to 10 years, were used. Today, practically all ties are treated and the average service life in main-line track is upwards of 25 years. If untreated ties were still being used, and if we assumed an average service life of 10 years for ties, the railroads would be installing nearly 100 million ties a year, or about four times the actual number going in today. Of course there are other factors, such as larger tie plates and rail anchors, that are contributing to longer tie life, but preservative treatment is largely responsible because of the high vulnerability of wood to decay.

Problem of the Transverse Fissure—The introduction in 1865 of rails rolled from Bessemer steel represented a great advancement over the rolled iron rails in use prior to that time. Somewhat later rails made from open-hearth steel began to gain in favor and are now in general use. But open-hearth rails, while an important forward step, brought a new and serious problem—the transverse fissure. It was not known until 1911 that many such rails contained the seeds of a hidden cancer-like defect that could get progressively larger, ultimately causing the rail to break, without any outward indication of its presence.

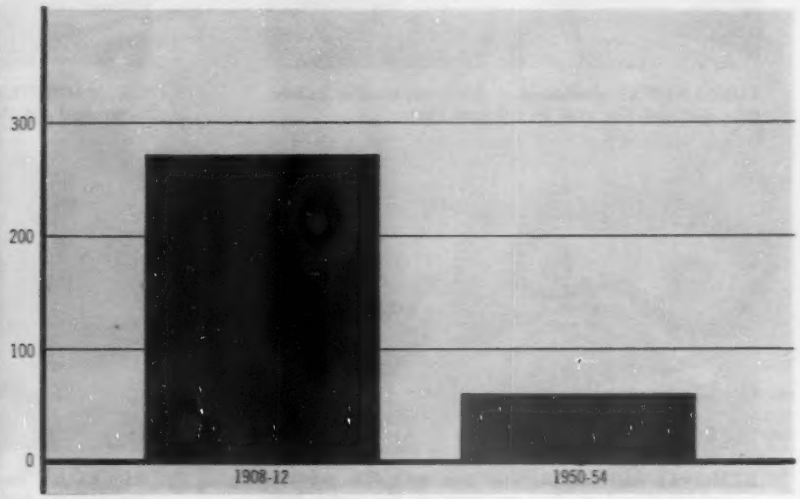
It was a disastrous wreck on an eastern railroad that first brought the defect to light. Eventually, Dr. Elmer A. Sperry developed a means, now widely used, of detecting the presence of transverse fissures before failure of the rail. Research ultimately disclosed that transverse

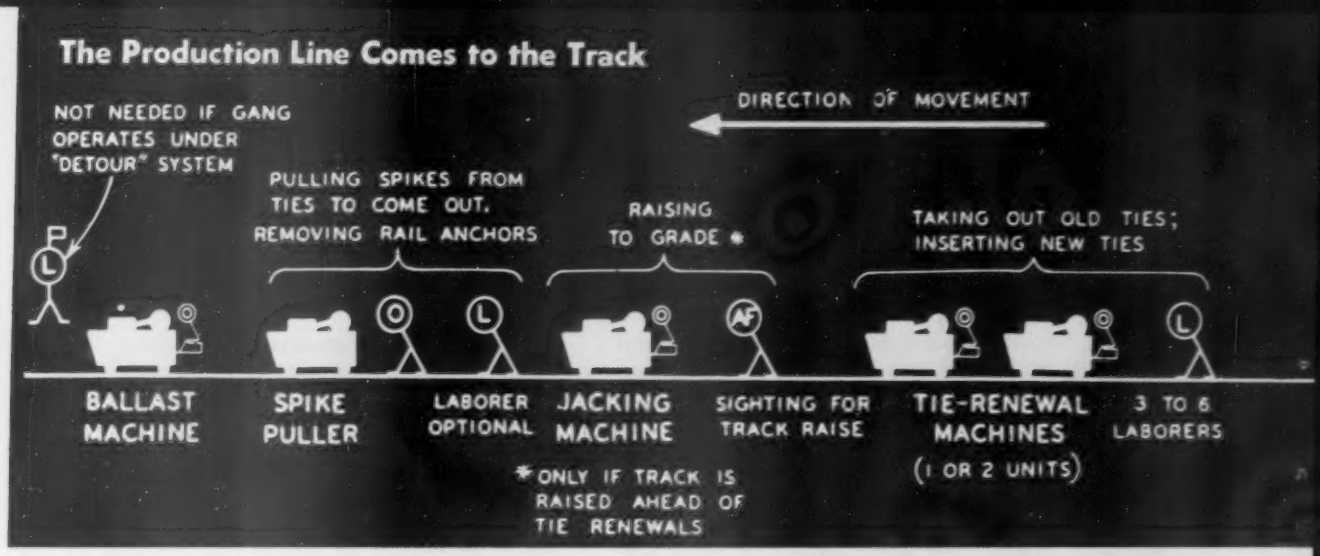
(*Continued on page* 388)

TIE RENEWALS

(average per mile, per year)

Longer life for crossties has cut renewals drastically (experience of the Santa Fe)





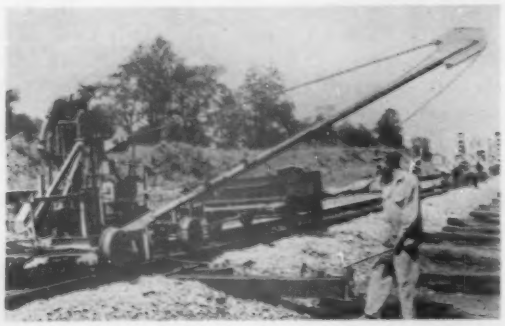
NOW MOST MAINTENANCE OPERATIONS ARE MECHANIZED

Machines are the center of attention in the track-maintenance field today. At the outbreak of World War II many track men were satisfied they had mechanized their maintenance operations to a pretty high degree, and that they were nearing, or indeed had reached, a ceiling beyond which no great amount of progress could be expected.

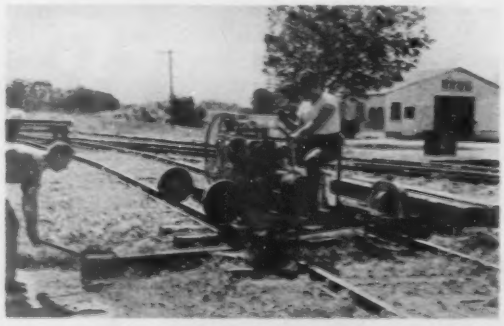
This ceiling, however, as it was seen prewar, has since been penetrated by a development curve whose rate of climb compares favorably with that of a jet fighter. And the curve, rather than giving indications of approaching a new ceiling, is heading in the general direction of the stratosphere.

Few, if any, persons in the field foresaw the phenomenal gains that have been made in mechanization since the war, but it is easy now, via hindsight, to see how and why they happened. It is important, first, not to minimize the progress made in mechanizing track work before the war. The gains were significant and provided a basis for further progress.

"Mass-Production" Tools Include Tie-Renewal Machines . . .



TIE RENEWAL machines of this type, usually paired, take out old ties and insert new ones.



TIE MACHINES of this kind may be rigged either to remove old ties or to insert new ones.

REMOVAL and insertion of ties with this machine is accomplished in two motions of the same ram.

ROTATING knurled steel cylinders in this type eject the old tie and pull the new one into position.

Roadway . . .

A LOOK AROUND

No More "Sacred Cows"

The developments in tie-renewal and track-surfacing machinery are a bulge in a broad frontal attack that is being made on the problem of mechanization of track work. Many minds on the railroads and among the manufacturers are at work on the problem. There is a new machine-minded attitude that is characterized almost by disdain for tradition and a lack of regard for "sacred cows." Revolutionary ideas that got a cool reception a few years ago—the under-track plow for example—are being re-examined in a mood that is marked more by a determination to overcome obstacles than to emphasize them.

Another characteristic of the new approach is a sort of wariness against being bound by trends in one direction or another. For example, it has appeared at times that maintenance men were leaning in the direction of off-track equipment for doing track work, but about the time this conclusion seems justified it is refuted by the development of a better on-track machine. An exception, of course, is the trend toward the use of highway vehicles for transporting men to and from the job, but even here there is a disposition to avoid extreme. The track motor car is recognized to have advantages under some conditions and also to work well in combination with the motor truck in many instances. If anything, the trend these days is toward machines that will operate both on and off the track.

The effective use of machinery requires an organization tailored to its peculiar needs. This not only means that today's typical track gang is tightly organized around the machines chosen for it, but that entire maintenance-of-way organizations have been revamped to allow for the fact that so much work has been taken away from the section gangs and placed in the hands of larger, mechanized crews. Practically all roads have at least lengthened their sections and some have dispensed with the conventional section gang altogether.

Mechanization is wholly or partly responsible for other developments. One is the trend to "cycle" maintenance, the purpose being to take full advantage of the mass-production characteristics of machinery. Closely related to this is the growing practice of scheduling maintenance programs in detail for the entire year, with the objective of holding disruptions to a minimum.

More efficient methods aren't the only way to cut maintenance costs—you can also reduce the amount of work to be done, and much is being accomplished in this direction. The growing popularity of continuous or "frozen joint" rail is an example. Another is afforded by efforts being made to lengthen tie life by means of pads, larger tie plates, hold down fastenings, and other expedients. A third is the greater use of frogs and crossings of manganese or heat-treated steel. And a fourth is the correction of "soft spots" in the track by grouting the roadbed.

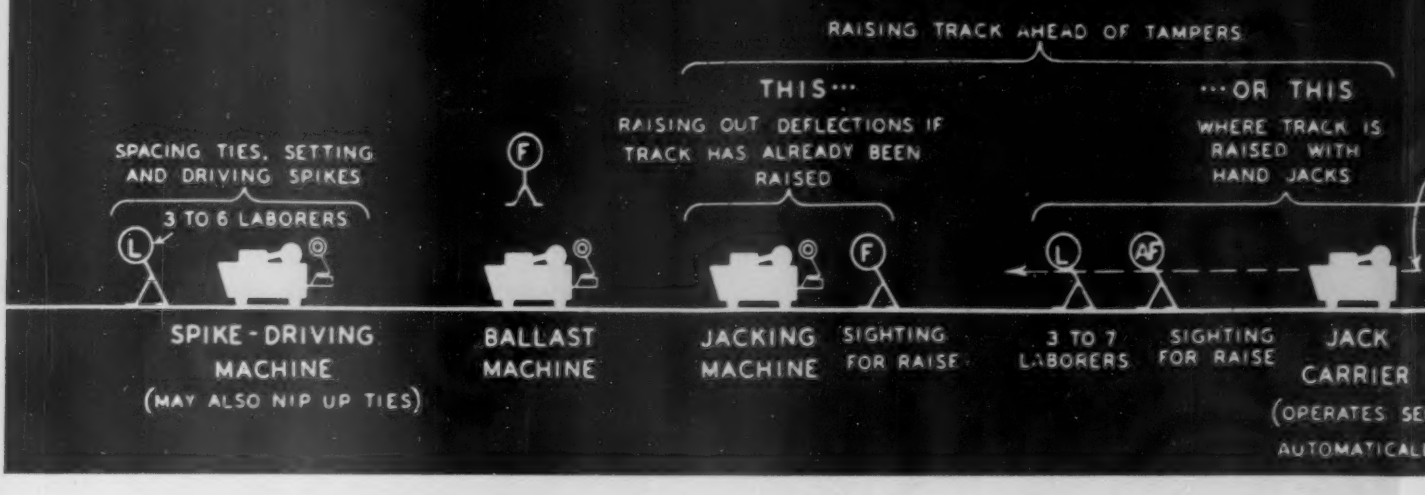
If any doubts remain regarding the progressiveness of the maintenance forces of the railroads, they can be dispelled by reference to two other developments. One is the extensive use of chemicals, including the latest formulations, in controlling vegetation on the tracks and right of way, and the other is the way in which the roads have incorporated the use of modern grading equipment in their ditching, bank restoration and right-of-way grading activities.

DEVELOPMENTS in ballasting equipment include an under-track device which, pulled by a work train, plows the old ballast out to the shoulder.

MOTOR TRUCKS and motor cars are frequently used in combination in off-line movements from job to job. This truck, for use by section forces, is designed to carry both a motor car and a push car, as well as men and tools.

EQUIPMENT of various types is now available for operation on and off the track. This inspection motor car consists of standard station wagon fitted with flanged guide wheels which can be raised in clear for highway operation.

CONTINOUS rail and rail welded into 78-ft lengths are gaining in popularity. Several railroads are welding practically all their new rail. One result is that improved methods of handling, unloading and laying long rails are coming into use.



At that time the rail-laying operation was the greatest beneficiary of mechanization. A pace-setting machine—the rail-laying crane—had come into use some years back. With this machine, rails could be picked up and placed in position so rapidly that it just wasn't possible to crowd enough men onto the track to do all the auxiliary operations by hand.

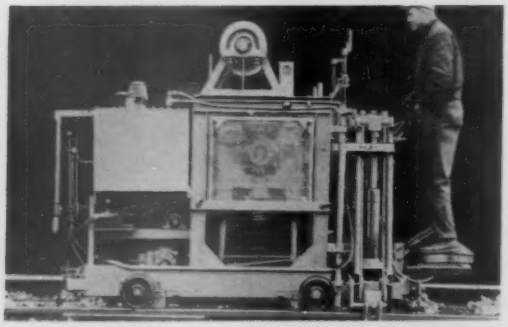
This situation forced the development of power spike pullers, nut runners, tie adzers and spike drivers. The rail-laying operation thus became an integrated, mechanized force—a production line brought to the track.

But the tie-removal and track-surfacing operations—a large element indeed in track maintenance—were another story. Various types of power-operated hand-held tie-tamping tools were in general use, and a few other types of machines for this work had appeared on the scene, but most of the operations—taking out and inserting ties, dressing ballast and lining track—were still done manually. Gangs of 100 men were common and sometimes they ran as high as 300 men, or even more.

Came the postwar period, higher wages and the five-day week—and the squeeze was on.

No longer could the railroads afford to expend a man-hour to put in a tie. Track men—and the manufacturers—began to think in practi-

. . . Tamping Jacks, Ballast-Working Equipment . . .

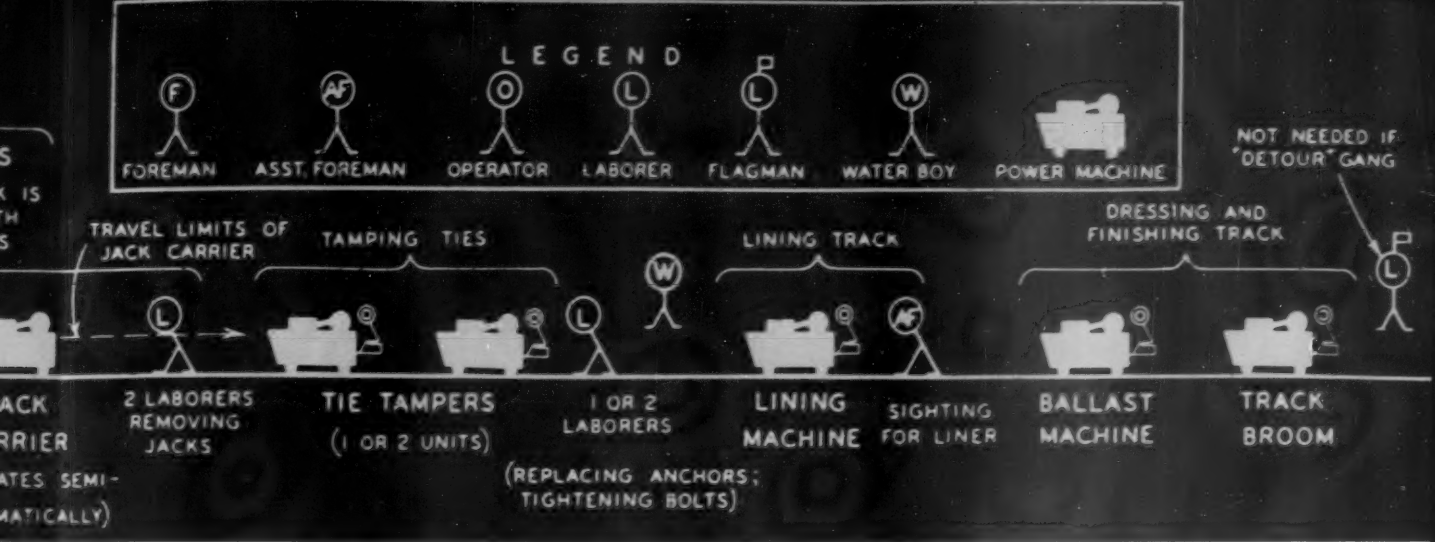


MACHINES for jacking up the track and tamping the ties to hold the raise are used. Here's one . . .

. . . HERE'S ANOTHER, which may operate in front of tie-renewal machines or ahead of tampers, or both.

COMBINATION machine for equalizing ballast and also cleaning off track following tamping operation.

BALLAST shaping and regulation are functions of this machine which also tears up grade crossings.



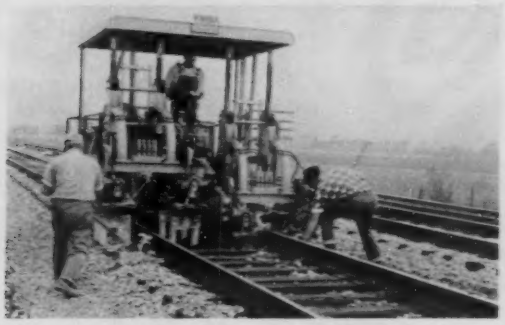
cal terms of a device they had only dreamed about before—a machine for taking out old ties and putting in the new ones. It was the toughest mechanical assignment they had tackled, but, surprisingly to some, it was solved and several types of machines are now on the market.

Other track operations now also yielded to mechanization—ballast shaping and dressing, track lining, and jacking-tamping. And one-man-operated "production" tampers had come into use to replace the outfits of hand-held units.

The different ways and combinations in which all this new equipment is being used are almost infinite in number. The diagram on these pages represents the composite practices of a number of roads on which the new types of equipment have been combined into a "production-line" setup for renewing ties, and raising, tamping, lining and dressing track. On roads with this general type of organization in effect the number of power machines in the gang ranges from 8 to 11 and the men from 25 to 35, including foremen.

An organization of this type will "put up" from ½ to 1½ miles or more of track per day, depending on track occupancy, and will renew 600 or more ties. To get the most out of the equipment some roads are routing trains around such gangs in multiple-track territory.

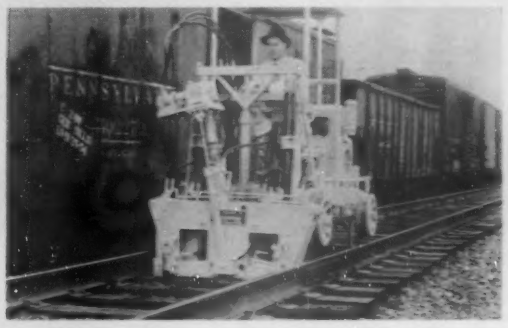
...Production Tampers and Track-Lining Machines



PRODUCTION tampers of several types available are almost a "must" for modern tamping gangs.

TRACK-LINING machines, with one operator, take the place of gangs of up to 12 men. Here's one type.

RETRACTABLE flanges on split running wheels of this lining unit allow sighting through machine.



ANOTHER type of track-lining machine can be fitted with wheels or with crawler mounting.

LINE CHANGES through rugged country are economically practicable with the aid of modern grading equipment.

Roadway . . .

A LOOK AHEAD

- **Integration of functions is next new dimension in maintenance**
- **There *may* be found a substitute for the wooden crosstie**
- **New earthmoving machinery will make feasible new categories of line improvement**

Recent rapid-fire developments in track machinery have caused hardly anyone in the field to conclude that the peak has been reached, or even approached. The effect, rather, has been to project the whole matter of machinery development into new territory where further opportunities for progress, not visible before, can be seen plainly.

The advantages inherent in machines that will do a variety of jobs have been recognized for many years. This thinking was largely in terms of machines that would do different jobs at different times. The effort is now entering upon a new phase—the development of machines capable of performing two or more tasks *simultaneously*, preferably with only one operator.

Both railroad men and the manufacturers are turning their thoughts in this direction. A railroader who has visualized the possibilities is J. P. Hiltz, Jr., vice-president of the Delaware & Hudson and a maintenance man of long experience. He would like to see a machine "which automatically raises its own track, carries its own grade and tamps uniformly." Furthermore, he says, "if candy manufacturers can have machines that automatically mix, dip, cut, wrap and pack their products, the railroad industry can have a machine that will automatically remove the spikes from an old tie, eject it, insert a new tie and spike it to the proper gage."

Limited capital for the necessary research and development work is a serious deterent to the realization of such dreams, but it is a fact that the manufacturers are edging in the direction of machines such as those visualized by Mr. Hiltz. A number of semi-automatic, multiple-function machines—a nipper-spiker and a cribber-adzer, for example—are already on the market, and others are certain to appear from time to time. It can be expected, furthermore, that there will be a progressive increase in the degree of automation as new machines make their appearance

Are Plastic Ties on the Way?

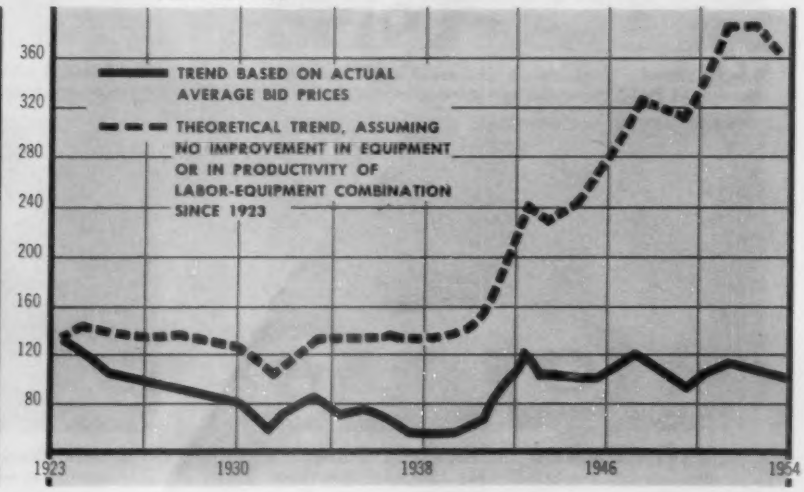
Some of the developments foreseen for the track structure itself are no less fantastic than those predicted in the way of new machinery. Take the crosstie, for example. Occasionally in the past there have been flurries of interest in the development of crossties of some material other than wood. Every type of substitute tie that has been tried out has failed to show superiority over

(*Continued on page* 373)

INDEX OF EXCAVATION COSTS

1925-1929=100

Improved equipment has held down cost of line changes



Communications . . .

A LOOK BACK

- **1851—Telegraph first used for train orders**
- **1877—Telephone used in railroad shops**
- **1914—Train-to-wayside radio developed**

Railroad communications really began with the birth of the telegraphic train order on September 22, 1851, when an Erie telegraph operator at Harriman, N. Y., sent the following message:

To Agent & Operator, Goshen:
Hold Eastbound Train Till Further Orders
Charles Minot, Supt. Erie

Mr. Minot was aboard the westbound Day Express when, as provided by the timetable, it was held at Harriman awaiting an eastbound train. He had the operator telegraph the next station west to find out if the eastbound train had arrived. Upon a reply that the eastbound train hadn't shown, the now-famous train order was sent. The train crew's order read:

To Conductor & Engineer, Day Express:
Run to Goshen Regardless of Opposing Train
Charles Minot, Supt. Erie

Upon refusal of the engineer to make the run, Charles Minot himself ran the train to Goshen, 14 miles. This telegraph train order process was repeated at several stations, and the Day Express pulled into Port Jervis hours earlier than it would have arrived had it advanced only in accordance with timetable rules. Soon the familiar pair of telegraph wires on wood poles was standard along railroad rights-of-way.

Only five years after Mr. Minot's historic telegraphic train order, the Pennsylvania entered into an agreement with the Pennsylvania Telegraph Company which read in part:

"That the railroad have a special line of telegraph which would be obtained from the telegraph company without cost . . . upon the terms of a simple grant of permission to erect wire upon the poles of the railroad company."

However, to show appreciation, the railroad agreed to maintain the pole line provided the telegraph company supplied wire and insulators. It also gave the telegraph company use of a handcar to carry men and wire along the line.

From this rather inauspicious beginning grew the vast railroad telegraph network in which almost every station agent was also the Western Union agent. This interrelationship between the railroads and the telegraph company continued strong until about 1945, when Western Union began a program of relinquishing its pole lines, turning them over to the railroads. Many roads today own and maintain these lines along their rights-of-way.

Just a year after Alexander Graham Bell sent his first message by telephone, the Pennsylvania installed telephones in its Altoona (Pa.) shops. A year later, the Central Pacific (SP) installed telephones along the right-of-way in the Sierra Nevada mountains to enable track walkers to report to their headquarters. Telephones for train dispatching came into use in 1879.

THE OPERATOR: Traditional pivot point of railroad communications for operating trains. Telephone train dispatching started about 1879 on the now-abandoned narrow-gage Boston, Revere Beach & Lynn. It was adopted by the New York Central in 1882.

But telegraph is still used, and until recently most operator-agents continued to work the key—chiefly for commercial or company business.

Telephone usage other than for train dispatching has become so commonplace that its scope is frequently overlooked. Although the automatic dial telephone became a reality in 1891, it was not until 1912-1914 that automatic systems came into large use on the railroads. Most early installations were in large passenger stations and general office buildings.

Railroad Radio by 1914

Railroad radio made its debut on the Lackawanna back in 1914. Although on a test run it proved successful for end-to-end communication, radio was not then developed to the point of being practical for everyday usage. In 1922, the Nashville, Chattanooga & St. Louis experimented with radio communication between the trainmaster's office at Guntersville, Ala., and division headquarters in Tullahoma, Tenn., nearly 100 miles distant. After several trials the idea was abandoned as not feasible. Subsequently a number of roads experimented

WIRELESS TELEGRAPH got a tryout on the Lackawanna in 1913. From this office in Scranton, Pa., station, messages were sent to and received from moving passenger trains. This was the Lackawanna forerunner of . . .

. . . RADIO ON THE LACKAWANNA LIMITED where, in 1914, calls were made via "radio-telephone" (i.e., full voice, like modern radio) from the moving train to Scranton, about 50 miles distant.

with radio—in yards, on trains and from train to wayside. But railroad radio did not really "catch on" until 1945, when practical, economical equipment, produced in quantity, became available.

Isolated experiments with inductive carrier train communication were carried on during the early twenties. The first permanent application in main line railroad service was made in 1937 on the Bessemer & Lake Erie, providing both end-to-end and train-to-wayside communication.

Communications . . .

A LOOK AROUND

Mounting communications requirements of today's railroads are being met by literally "stacking" more circuits on existing wires—by utilizing a range of imposed frequencies. This "carrier" method of "getting the most out of the least" is being applied with vigor in telegraph, printing telegraph and telephone communications. One 12-channel carrier system, for example, can provide up to 216 two-way printing telegraph circuits on a single pair of wires.

Microwave has the same high-capacity feature as carrier, but air is the path for the circuits instead of line wires. This "beamed-radio" is not disturbed by the weather, especially the sleet storms which sometimes break line wires disrupting communications. The Rock Island and the Santa Fe have had microwave systems in service for four years. Other roads are joining them this year. In one installation now under construction, microwave will replace signal and communications pole lines in northern California mountains.

Radio—newest fundamental of railroad communications—is already a giant. Since 1945 more than 6,100 locomotives, 3,000 cabooses and 1,200 offices have been equipped with radio for road train and yard usage.

Saturation is yet far off. Solid, intensive radio coverage is the goal of most roads—to provide wayside stations spaced from 20 to 30 miles apart, so that a train is never out of range of a station. Spreading daily also is the technique of dispatcher control of wayside stations, by which he can talk directly to train crews on moving trains several hundred miles distant.

More than 2,300 walkie-talkies are in service now on the railroads. Fields for their use are many—car checking; car inspection; setting out cars on the road; movement of rail-laying trains; and communications between track foremen and machine operators. By incorporating transistors and printed circuits into walkie-talkie sets, their weight is reduced and their range increased. Such sets are just now on the market, and soon will be considered standard equipment.

Viewers of industrial TV on the railroads do not see "spectaculars"—but they are enjoying a spectacular new tool, for which new uses are being found almost monthly. The first permanent installation of TV in railroading was made in 1954 to enable a Pennsylvania "train director" to see switcher operations beyond his view at the Pittsburgh post office. Since then two other permanent installations are in large freight classification yards on the Southern and RF&P. TV cameras positioned at

the yard entrance transmit pictures of trains arriving, enabling the yard clerk to check initials and numbers.

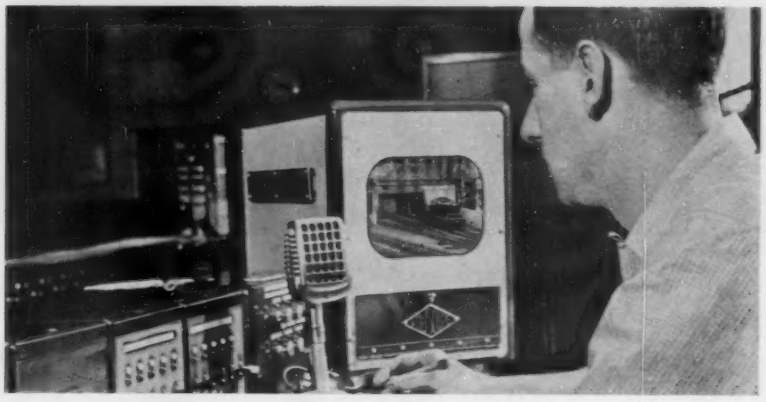
Extensive testing is being carried on to determine TV's effectiveness in providing yardmasters with a general yard surveillance or with close-ups of "hot spots."

Railroad TV systems are unaffected by weather or atmospheric conditions; a wire circuit connects camera and receiver. Of them one railroader observes: "TV watches without coffee breaks or overtime pay and doesn't complain about rain or snow."

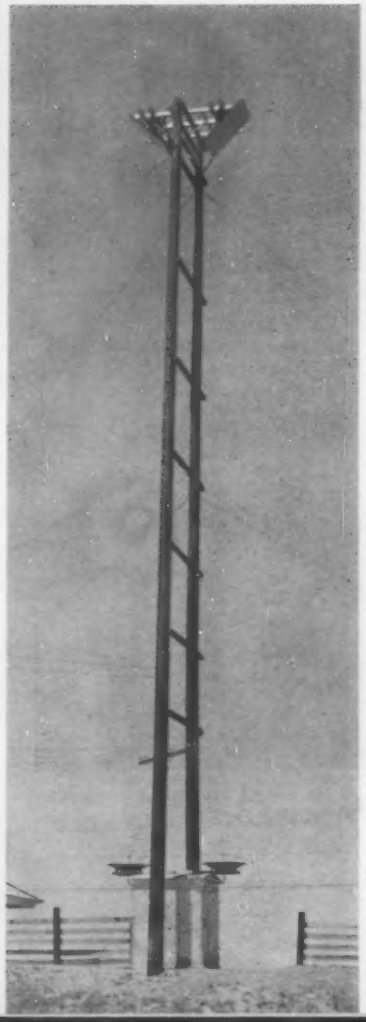
DISPATCHER USES RADIO to talk directly to train crews (console at left controls wayside radio stations). Radio is not used normally to transmit train orders, but is a time-saver when emergencies develop.

WALKIE-TALKIES spread on-the-ground intelligence in manifold phases of railroading. Here space communications keeps the hind man on a welded rail-laying crew in touch with his colleagues.

The Big Trends Today



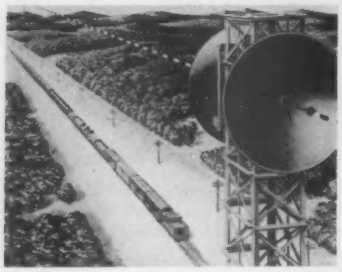
TELEVISION EXTENDS EYESIGHT "around corners" for directing switching movements.



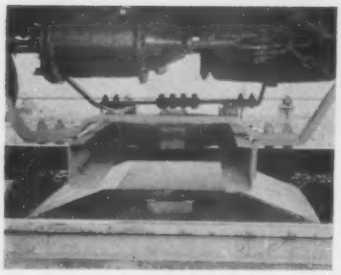
MICRO TOWERS are becoming familiar sights along rights-of-way.

YARD LOUDSPEAKERS enable the "Big YM" to supervise every man in a far ranging territory.

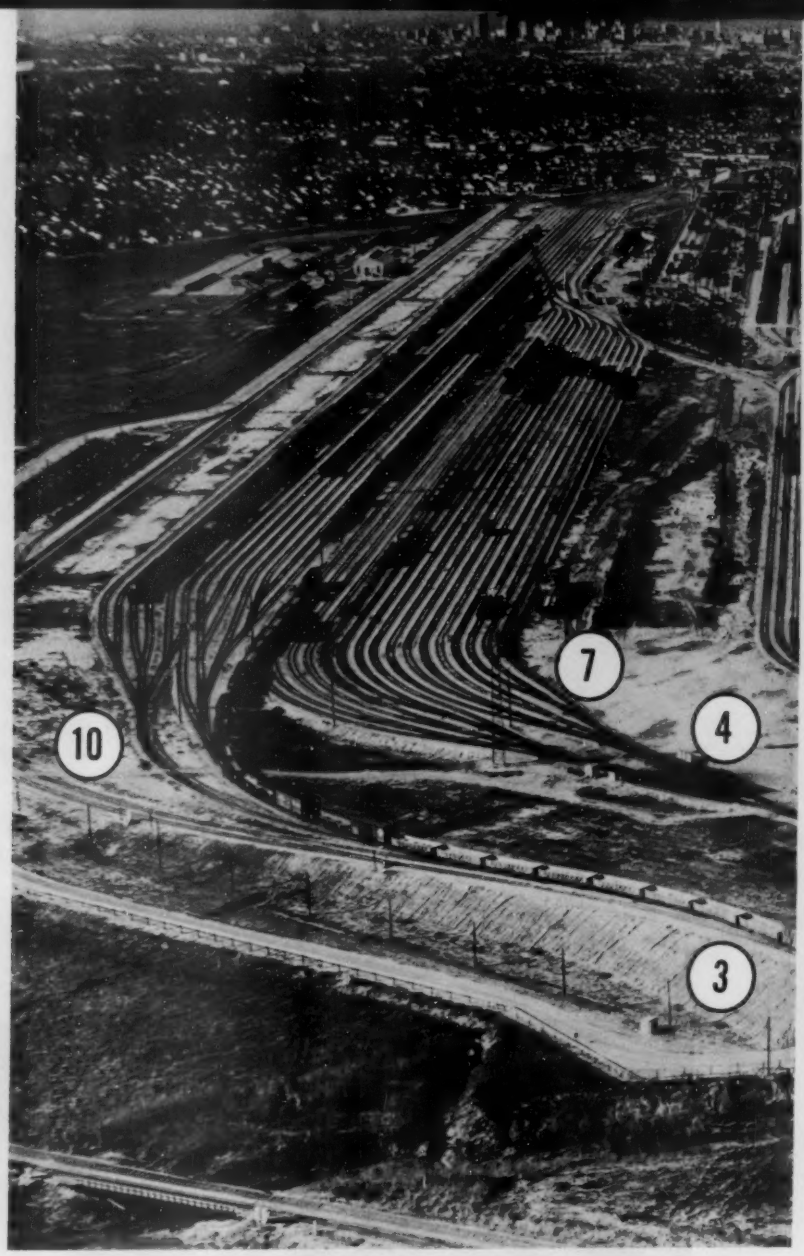
1 Yard loudspeakers—Quick call and answer back



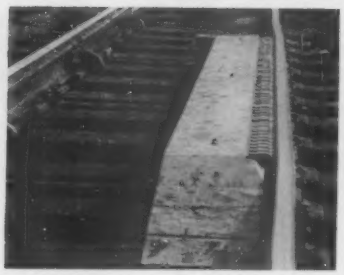
2 Microwave—Beamed radio for privacy



3 Train identification—Sets up its own routes

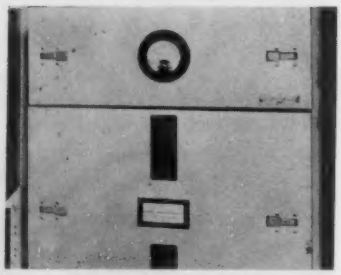


Electronics at Work

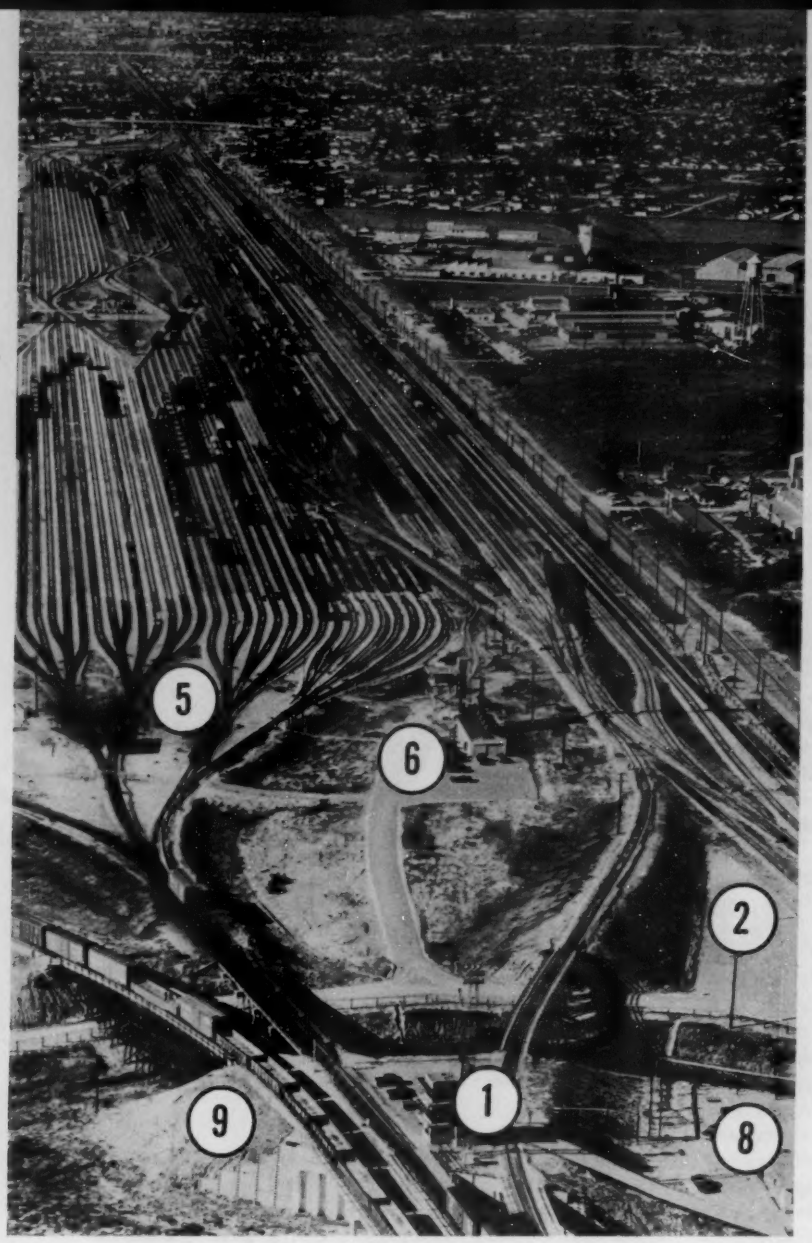


4 Detector — Locates broken wheels

5 Radar—Automation control of retarders



6 Carrier—Many circuits on one pair of line wires



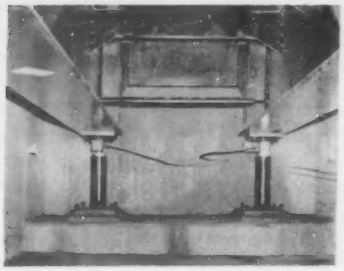
on the Railroads

Inherently, railroads are a *centrifugal* business; motivation comes from headquarters, but the actual jobs are done by men and machines, working alone, scattered over a wide area. Electronic devices—which "get the word around fast"—are, then, a particular godsend.

No facility gains more from electronics than one of the vast new classification yards, with its approaches and by-passes. Typical is the Southern Pacific's new Englewood yard at Houston. Keyed to conventional locations therein are shown ten exciting electronic devices (not necessarily the type or make installed at Englewood) which are in actual service somewhere on an American railroad.

7 Dick Tracy — Radio in yard crews' hands

8 Television—The remote-control seeing-eye



9 Electronic track scale—Motion weighing at 3 mph

10 Cab signaling—Long-distance eyes for engineman

Communications . . .

—IN THE DECADE AHEAD...

- **Must be vastly expanded to exploit speed of electronic "brains"**
- **Will provide automatic switching for interline car reporting, coast to coast**
- **Will absorb many times existing circuits**

The giant "brain" being hoisted to a new data processing headquarters is symbolic of the kind of large-scale "digital computer" some dozen railroads in the U.S. and Canada have ordered. It will give management the kind of integrated information it needs at incredibly fast speed—*provided* management also sees to it that its communications network has the speed and capacity to funnel in and distribute the information which its electronic impulses digest, reassemble and grind out. The indispensable preparation to the full use of data processing equipment is expansion and refinement of a railroad's communications system.

The railroads have already entered the era of "automation of intelligence." They have actively adopted modern business machines to accounting processes, purchases and stores operations and inventory, movement and assignment of freight and passenger cars, payrolls, pay checks, dividend payments and cost accounting, among others. Daily inventory of empty freight cars by type and location, perpetual inventory of stores, and "queuing" of inspection scheduling of locomotives are examples of uses for digital computers already at work.

A coast-to-coast passenger reservation system is being installed by the New York Central, New Haven and Santa Fe. Agents' keysets in 60 cities will be connected to electronic memory storage drums in New York and Chicago which can store reservations for all trains of the three roads for up to seven months. Several other railroads are actively interested in joining the system.

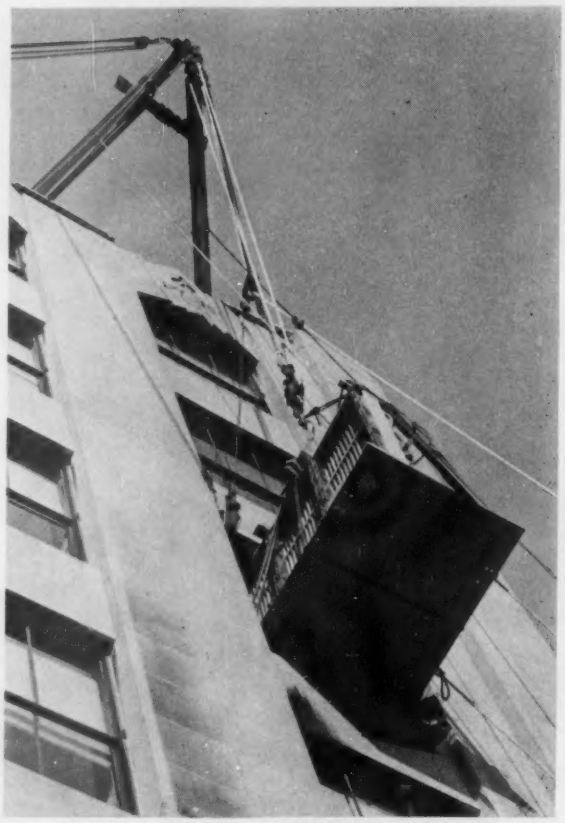
Car Reporting

Printing telegraph will continue to be installed in greater quantities on all railroads. Soon all major railroads in the U.S. and Canada will utilize it for system-wide car reporting systems.

These systems will be tied together as present difficulties—like station code numbers—are overcome. Right now, the Union Pacific, Southern Pacific, Chicago & North Western and Milwaukee are interchanging car reporting information for cars in service between Chicago and the West Coast. By 1966, coast-to-coast car reporting, covering virtually every railroad in the country, will be in service.

Transceivers, a new development, will undoubtedly be utilized to a greater extent. These devices transmit and receive over long distances the information on punch cards.

Biggest future . . .



IT TAKES MORE than a lift to get a giant "brain"— like this Univac—into action. It takes good communications.

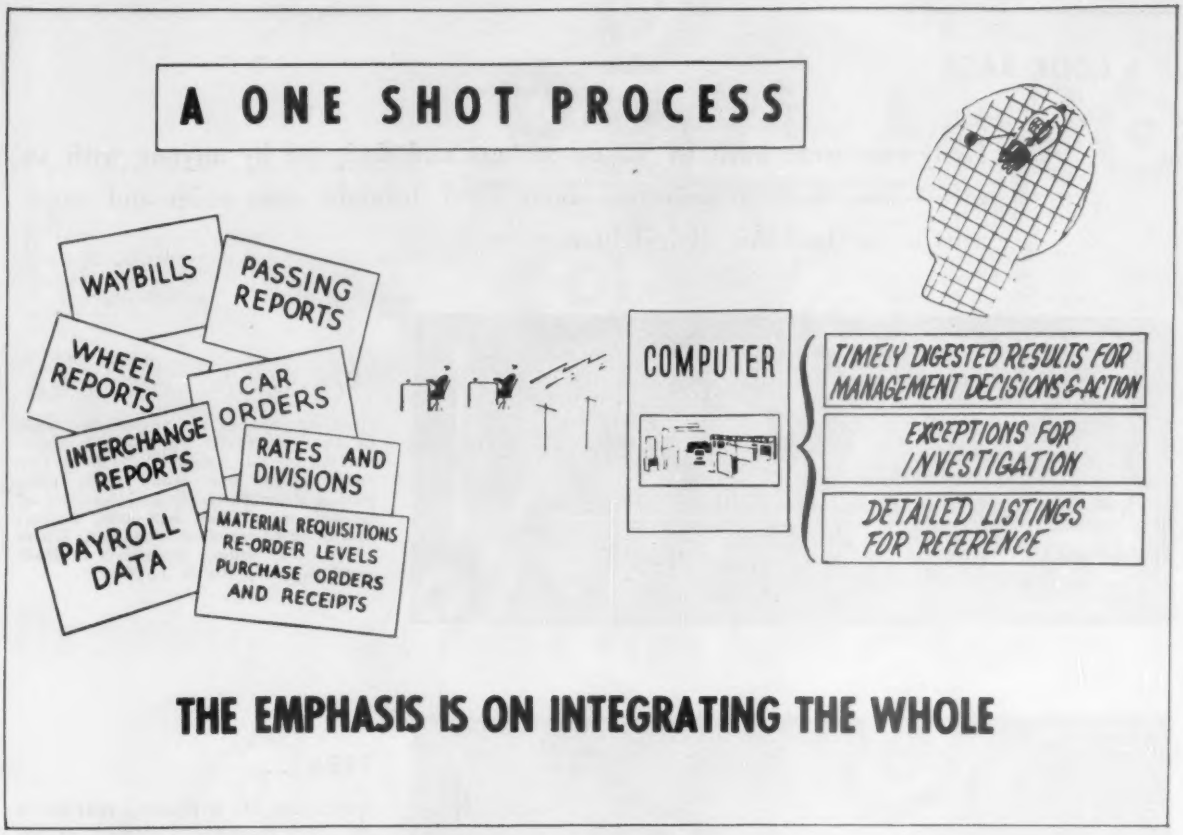
A number of railroads have automatic dial telephone systems in service; more will install them. The trend to intercity long-distance dialing is strong. (The SP will have intercity dialing on its entire system in about two years, and the UP has started such a project this year.) By providing better telephone service, many roads will experience a decrease in costly letter mail. One railroad's motto is: "Don't write if you can wire; don't wire if you can phone."

Transmission by wire of written information which is automatically reproduced at the receiving station will have many uses on the railroads. Already the Pennsylvania, for example, is using Intrafax facsimile to issue tickets remotely at offices of large industrial customers and outlying ticket offices. Facsimile may be used for tying yard offices with yardmaster's, retarder and interlocking towers—transmitting switch lists, for example.

To provide more circuits for these expanded uses of communications, the railroads will make use of carrier—which gets more work out of existing line wires—and microwave. Some roads will install twice as much carrier in the next five years as they did in the previous five years.

Several railroads are looking to microwave to supple-

. . . is tie-in with data processing



THE COMBINATION will give management the information it needs in time to take action. Here is how the Chesapeake & Ohio sees the job.

ment or replace pole lines. Microwave, like carrier, is a many-circuit facility. It can handle up to 120 voice channels—each channel capable of handling up to 18 telegraph or printing telegraph circuits. Several possibilities for its use are being considered: one road thinks microwave would provide additional circuits more economically than laying a submarine cable across a bay; Another road would "collect" communications traffic at an on-line terminal and provide microwave transmission to off-line headquarters.

While present-day microwave systems have repeater stations approximately 30 miles apart, a new development—known as "over the horizon" microwave—utilizes larger, more powerful antennas—capable of sending the "radio beam" 200 to 300 miles without repeater stations.

Radio will be "standard equipment" on locomotives, cabooses, in wayside offices and yard offices. It will be available on official automobiles of yardmasters, trainmasters, division superintendents and supervisory personnel in the signal, communications and engineering departments. The lineman will have radio on his track motor car, as will the track supervisor. Track maintenance equipment—like tampers and ballast regulators—will keep in touch by radio. Radio will enable scattered railroad personnel to work, in effect, like those of most other industries do "naturally"—side by side.

By 1966, major yards will be equipped with industrial television to provide for the yardmaster general surveillance and close-up views. Car checking and car inspection by TV will be commonplace. Other uses of TV seem limitless. The Pennsylvania, for example, will use it in a new ticket sales bureau to show clerks and passengers at a number of spots what space is available.

An electronic hot box detector which will detect heat radiated from freight car journal boxes on trains moving at 60 mph is about to be installed on the Rock Island. It will transmit intelligence of hot boxes to points where proper action can be taken immediately.

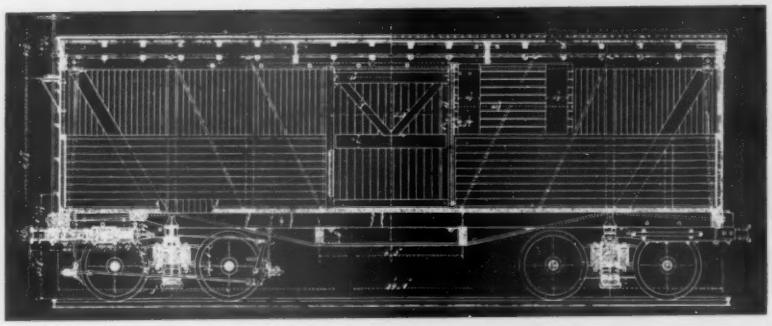
A line-side photoelectric device which automatically identifies freight cars moving up to 60 mph—by "reading" black and white stripes on their sides—is now in the testing stage. Working with a Teletype machine this unit could "read" the cars of an outbound train and send a checked, last-minute consist to points beyond.

Transistors and printed circuits, now available in a limited number of electronic devices, will become standard components during the next decade for carrier equipment and radios. Use of these two developments will lower maintenance costs because whole units can be pulled out and replaced. Transistors and printed circuits will probably cut the weight of standard railroad radio equipment in half.

Freight Equipment . . .

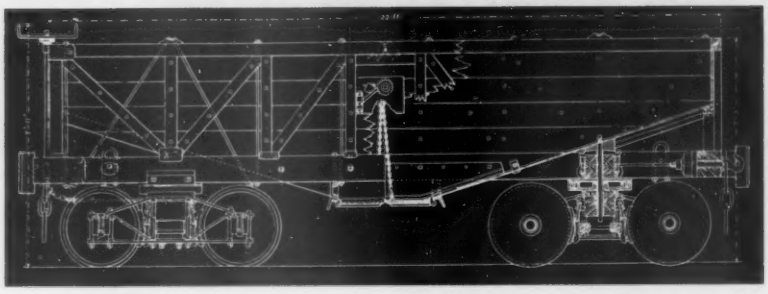
A LOOK BACK

Early cars were built by wagon makers and designed by anyone with an idea—The MCB Association, about 1867, brought some order and standards to the building of freight cars



1876 . . .

Here was one of the typical box cars of the post-Civil War period which had an overall length of 29 feet. The construction was wood with sills, plates, floor stringers and flooring of Georgia pine. The end sills, buffers and body frame were white oak. White pine inside lining. Described in Railroad Gazette, March 1876.

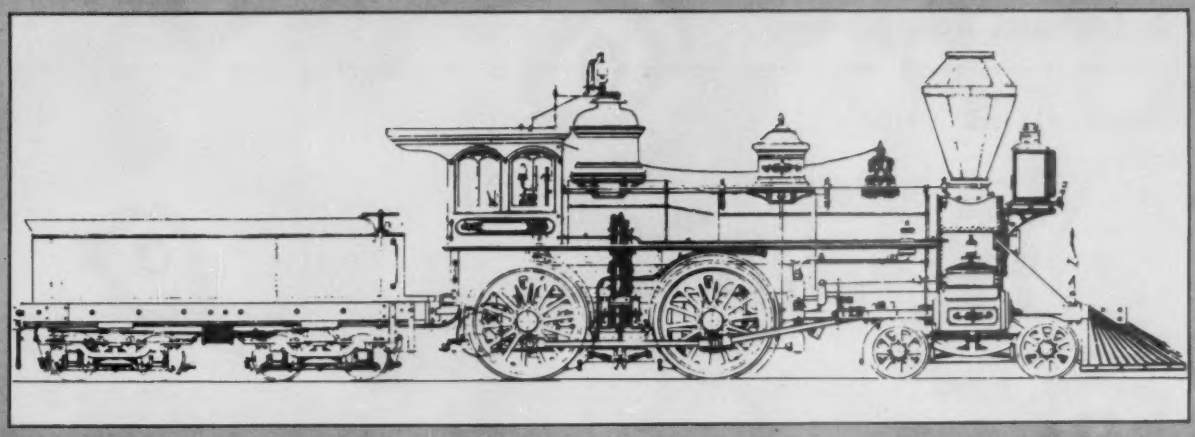


1884 . . .

A Philadelphia & Reading coal car of the hopper type, described in the Railroad Gazette, July 18, 1884, was 22 feet long, had a capacity of 16 gross tons and load limit of 25 gross tons. The light weight of this car was 18,480 lb. The hopper doors and slope sheets were wrought iron; the body wood.

High Spots in Evolution Of the Freight Car

1828—Horse-drawn cars with wheels turning on axle.
1834—Eight-wheel car on four-wheel trucks.
1835—Introduction of cars with springs.
1837—First use of hopper type cars.
1840—Hacker car in form of barrel.
1847—First order for iron coal cars.
1849—Rubber springs in use on freight cars.
1857—Insulated cars—spaces filled with sawdust.
1871—Refrigerator car with ice bins at ends of car.
1874—First use of steel in freight car construction.
1877—Cars with capacity greater than 20,000 lb.
1879—Cars with capacity of 40,000 lb.
1880—Hopper cars with all-metal bodies.
1881—Stock cars with watering troughs and feed bins.
1888—Westinghouse invents a friction draft gear.
1893—Safety appliances standardized under Act of Congress.
First cast-steel truck bolster.
1896—Hopper cars of 100,000-lb capacity.
1898—The all-steel-car era begins.
1900—First cast-steel truck sides with integral journal boxes.
1922—Containers in use in freight service.
1925—First one-wear wrought-steel wheel.
1927—Steel underframes compulsory on cars built after January 1.
1931—First aluminum hopper car.
1934—First low-alloy-high-strength freight car.
1935—Roller bearings on freight cars.



PLAIN AUTOMATIC brake system description in an 1876 issue of Railroad Gazette showed design which, for the first time, had only one train line. The first automatic brake system described in 1873 had required "three lines of pipe" through the train. From a safety standpoint this was still a vast improvement over Westinghouse's original 1869 straight air design.

Braking Has Met the Challenge

George Westinghouse's straight air brake of 1869 was superseded three years later by the plain automatic brake. The original straight air brake had exhibited a critical deficiency—it depended on the locomotive-mounted main reservoir for its application pressure. If the system became inoperative because of a broken train line or burst hose, knowledge of that fact was not conveyed to the engineman until he attempted to apply the brake. The plain automatic braking system stored the compressed air supply on the individual cars. If a break occurred in the line or hose, brakes were applied immediately.

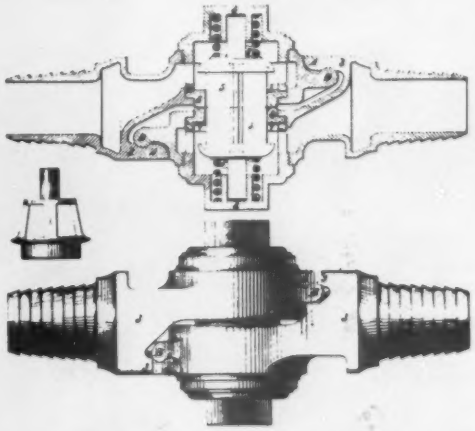
In 1880 the first air brake for freight cars was introduced. By 1885 the Master Car Builders Association appointed a committee to study the application of power brakes to all cars. In 1887 the Burlington tests proved that a 50-car train could be satisfactorily controlled when all the cars had the Type H, quick-action triple valve. The problem in brake applications on successively longer trains has always been that of rapid, serial action.

During the 1887 tests, work was done with electrically actuated braking. However, development of the quick-action features made continued use of the complete pneumatic system practical. The Safety Appliance Act of 1893 gave final impetus to the universal application of air brakes.

By 1907 the Type K brake was replacing the Type H brake because of the increasing length of trains. In 1932 the AB brake was introduced, and this equipment is now mandatory on all freight cars.

During the early stages, the same brake schedules were used on both freight and passenger equipment. Refinements of control and emergency stops from high speeds called for the development of special brake equipments for passenger service. The most recent widely used passenger brake, the HSC, was introduced in 1934. Electrically actuated braking also made its appearance.

The introduction of diesel road locomotives and the more recent introduction of the low-slung, lightweight passenger train have in each case found the air brake manufacturers ready with suitable equipment. This has continued the tradition—these companies have always produced equipment to meet demands resulting from the evolution of rolling stock and operating practices.



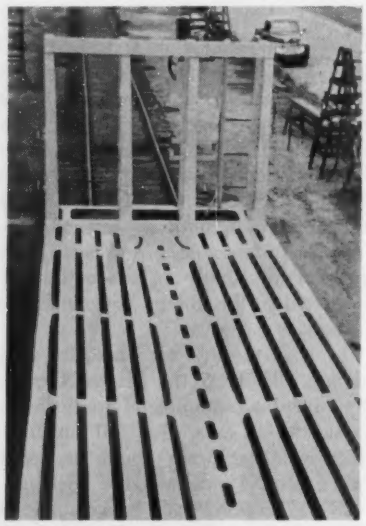
FROM END TO END . . . this "clutch coupling" for rubber hose ends of 1876 was one of the links making possible complete power braking. From its beginning, the air brake itself has been a vital link in continuing railway progress.

Freight Equipment . . .

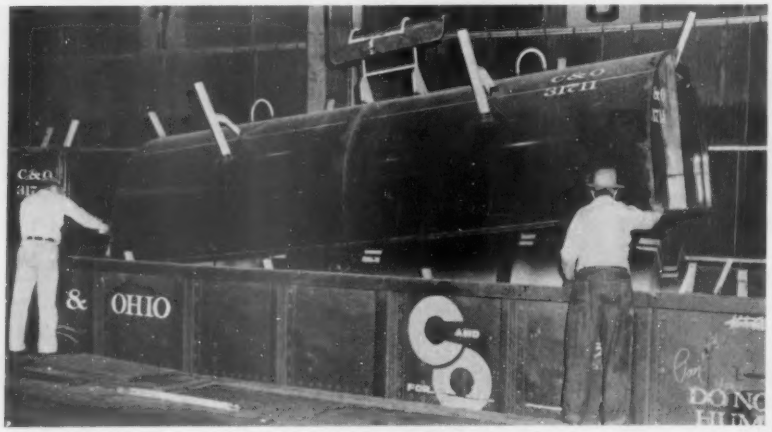
A LOOK AROUND

REFRIGERATOR CARS, over a period of many years, have been cooled by ice. Now, mechanical refrigeration is not only doing the job better but has enabled the user to ship many products by rail not before possible.

ROLLER BEARINGS on all of its equipment have given the Quebec North Shore & Labrador, isolated from physical interchange of cars, a unique laboratory opportunity.



MODERN RACK CARS (above) for handling pulpwood are built of cast steel, with sloping, self-cleaning floors. The box-car end height permits shipments such as bundled plywood.



OPEN TOP cars (left) such as this are used for shipments requiring weather protection simply by adding the cover. Even grain has been shipped this way.

Adapted to piggyback as well as to siding-to-siding, all-rail service is a combination of inexpensive removable "container" superstructure and basic car foundation now available.

Piggyback has produced a lot of drama as well as profitable tonnage. This service has opened up a growing volume of business from off-track shippers and receivers.

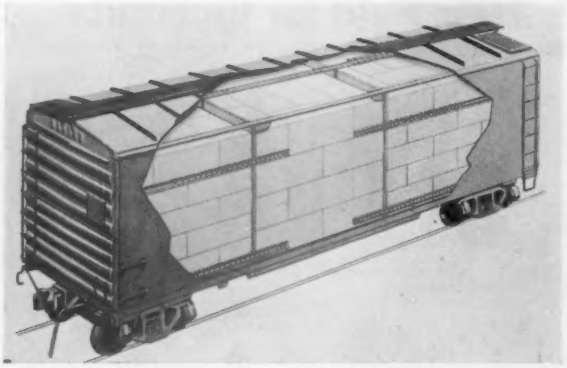
TOFC, Alias "Piggyback," Opens New Field for Ingenuity

The demountable container — transferred by crane between highway trailer bed and railroad flat car — is another system for exploiting road-rail coordination.

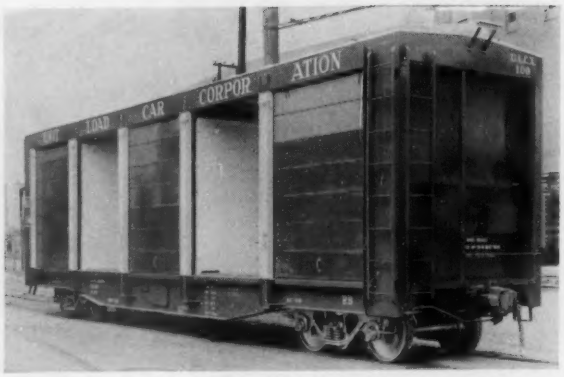
The Box Car Is Changing

The plain box car held the limelight for six decades but changes in distribution methods, including unit loading, led to a demand for a wide range of devices.

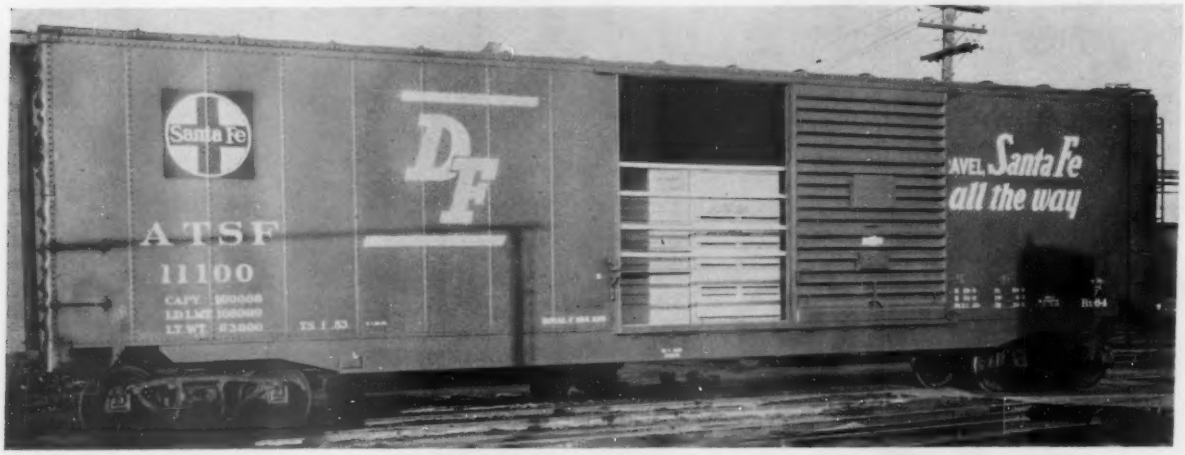
Box cars are the backbone of the railroad fleet. One day saved in turnaround would be the same as adding 100,000 cars.



Pullman-Standard's "Compartmentizer" cuts damage claims and eliminates the need for dunnage.



The Unit Load car has separate compartments and "roll-up" doors.



Here is a typical example of a rail-shop-built box car for special loading—equipped with Evans loaders.

Freight Equipment . . .

A LOOK AHEAD

By WILLIAM M. KELLER
Executive Vice-Chairman and
Director of Research
Mechanical Division, AAR

It is easier to ask than to answer a question. An answer which is accurate today may be made inaccurate by new technology which is developed tomorrow. We may predict ten years ahead to anticipate what future rail freight equipment may be like, however wrong changing events may make the prediction.

There are two million freight cars in the U.S., and the investment is of such magnitude that this fleet cannot be scrapped and replaced without showing a very high return on the new investment. Some 625,211 cars have been built in the 10 years since the close of World War II, and since these cars are relatively new, they will be with us for some time to come. It is, therefore, difficult to visualize equipment which will be so much more efficient that it will earn such a large return on the carrying charges on the new capital—and also the expense incident to prematurely scrapping equipment which has not yet been fully depreciated—that its use can be justified.

With these factors in mind, we may expect that the following dimensions will prevail in order to make new equipment compatible with existing cars 10 years hence:

- Coupler heads capable of use with existing couplers.
- Coupler height — 33½ in. (no change).
- Floor height — approximately 44 in. (no change).
- Wheels — 33-in. diameter (no change).

Each of these items has a background which will strongly militate against change. In the case of coupler heads, any change must be such that existing couplers can be utilized, otherwise all couplers would have to be changed overnight—obviously a task of such proportions as to be completely impractical. The same situation prevails as to coupler height.

Car floor height of about 44 in. is closely related to the general height of loading platforms, of which there are vast numbers in the United States. Additionally, this is approximately the height of motor truck floors. With all this loading equipment at the 44-in. level, it requires some very compelling reason to change car floor height.

Wheels do not seriously affect car geometry. The present 33-in. wheel does not create space requirements that have a governing effect on car design. Also, it is desirable to keep the weight per inch of diameter as low as possible, so the diameter is not likely to decrease.

Without changing these four items, the designer nevertheless has a wide range of possibilities. Within the generous space limitation of some 15 ft high, 10 ft wide, and 40 to 60 ft long, the imaginative designer can develop any vehicle required for transportation. A review of existing equipment will show that cars providing transport of liquids, mineral products, livestock, grain, machinery, lumber, and perishable foods now exist in various forms. Some types of equipment are in declining demand. Stock car use has diminished and poultry cars have disappeared. More changes will come.

The two opinions most frequently expressed as to design of cars are diametrically opposite. The first is that an "all-purpose" car should be the car of the future. Some people believe this idea presents a wasteful compromise with specialized cars without completely satisfying the shipper.

The proponents of the specialized car state that acids and corrosive liquids, livestock, perishable food products, ore and coal are all so basically different that it seems elementary that tank, stock, refrigerator, and hopper cars, respectively, are required for their transportation. Nothing appears simpler than this explanation of the need for special-purpose cars, at least to those who hold the all-purpose car viewpoint.

There is, on the other hand, the matter of car distribution. To have cars of the all-purpose type will reduce empty car mileage, reduce the car fleet, and increase annual miles per car. If the car is really all-purpose, of course these claims are true. However, the real all-purpose car is difficult to build. What provisions to make for the various commodities becomes a major problem. Obviously, coal, bananas, and livestock cannot be hauled in the same car without such elaborate provisions as to make the car impractical.

Considering the "specialized car" viewpoint, it is found that three basic classes of house cars appear to be required, namely refrigerator, stock, and regular box cars. The proponents of specialization desire to go further. The refrigerator car would be provided for low-temperature commodities (frozen foods), for meat, fresh vegetables, and for commodities requiring ventilation. The stock car needs no division of types, but the box car is frequently thought of as an automobile parts car, grain car and general service car. Thus, the house car falls into many types.

The flat car also requires a division of types for specialized service. Some of this variety is inevitable. It would be needlessly expensive to provide a standard

(Continued on page 380)

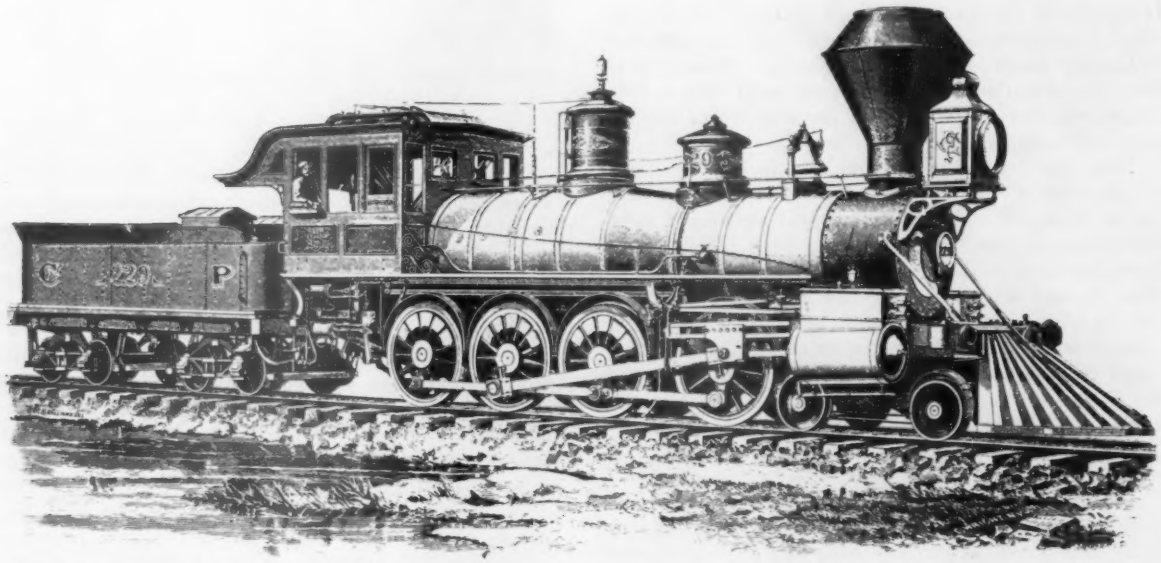
The Author . . .

Mr. Keller has been a railroader since 1919, when he went to work for the Pennsylvania as an apprentice at the Altoona Works. He moved up through the mechanical department of that railroad—with time out to attend the University of Pittsburgh and to get a degree in mechanical engineering at Pennsylvania State College in 1932. From 1945 until 1952, he served the PRR as assistant mechanical engineer—all services. In the latter year he went with the AAR as director of mechanical research.

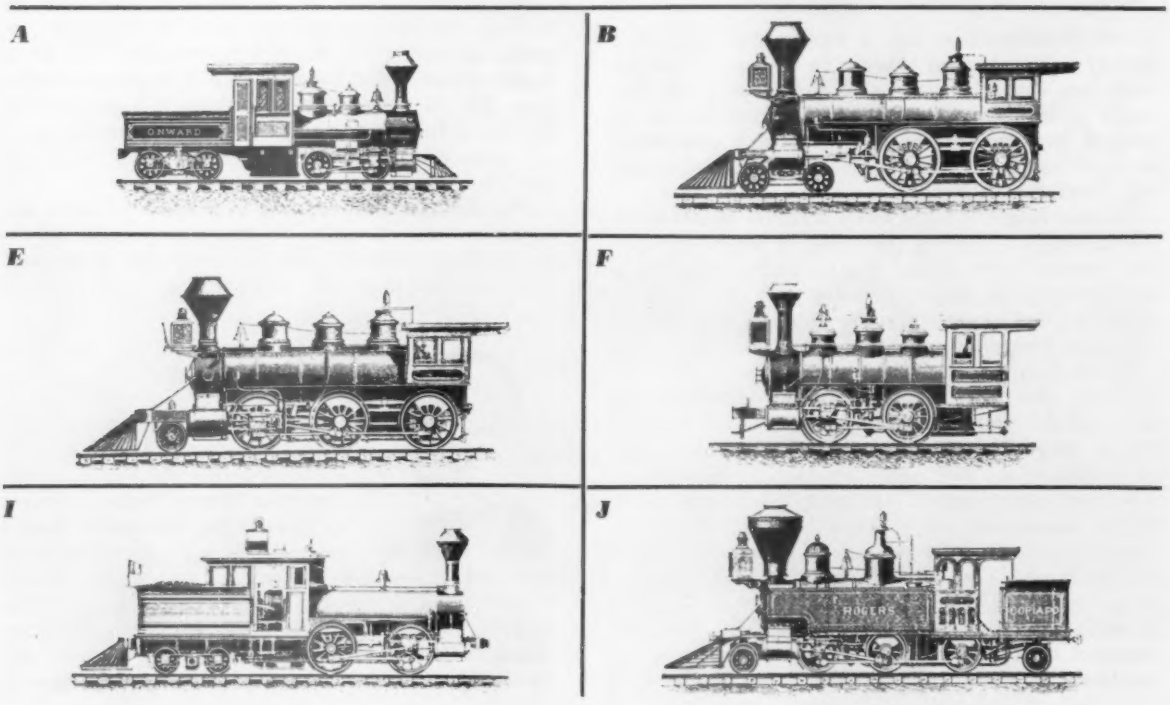
Motive Power . . .

A LOOK BACK

Specialization in steam locomotive development got under way in the 70's. Design ranged from "giant" 12-wheeler to tiny tanks.



TWELVE-WHEELED LOCOMOTIVE built at the shops of the Central Pacific at Sacramento, Cal., from the design of A. J. Stevens, general master mechanic.



Catechism of the Locomotive

BEGINNING with the January 3, 1873, issue, the Railroad Gazette published serially the "Catechism of the Locomotive." This work was written by Railroad Gazette Editor Mathias N. Forney. The suggestion in its title was well taken because, during the next twenty years, this work republished in book form became the "bible" for locomotive operating and maintenance men throughout the land.

In its book form "Catechism of the Locomotive" was also published by the Gazette; it went through two editions and many printings. It dealt with the theory and details of steam locomotive design and operation during the era which saw the change from the almost-universal 4-4-0 type to a series of specialized locomotive designs for various types of railroad operations. Simmons - Boardman's "Locomotive Cyclopedia" is its closest modern counterpart.

"Catechism of the Locomotive" always contained many accurate, beautiful, and carefully executed wood cuts of complete locomotives and all their components. The quality of these has led various publishers to use them to portray the locomotives of the 1870-90 era.

Shown here are a series of the cuts taken from the 1873 issues of the Railroad Gazette as illustrations for the "Catechism." They portray the locomotive models then current.

A **Double - truck Narrow Gage Locomotive by the Mason Machine Works, Taunton, Mass.**

B **American Locomotive by the Baldwin Locomotive Works, Philadelphia.**

C **Double-end Tank Locomotive by the Rogers Locomotive & Machine Works, Paterson, N. J.**

D **Consolidation Locomotive by the Danforth Locomotive & Machine Co., Paterson, N. J.**

E **Mogul Locomotive by the Baldwin Locomotive Works.**

F **Four-wheeled Switching Locomotive by the Hinkley Locomotive Works, Boston.**

G **American Locomotive by the Hinkley Locomotive Works.**

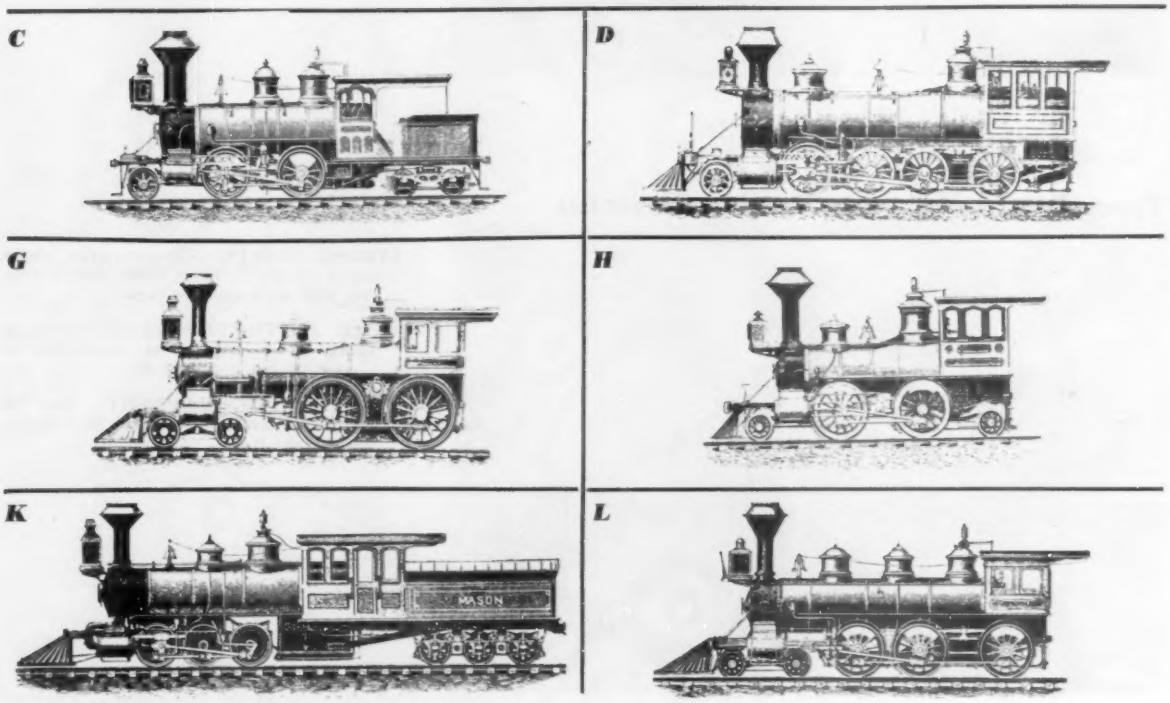
H **Double-end Locomotive built by the Grant Locomotive Works, Paterson, N. J.**

I **Improved Tank Locomotive designed by M. N. Forney.**

J **Tank Locomotive by the Rogers Locomotive & Machine Works.**

K **Double-truck Locomotive by the Mason Machine Works.**

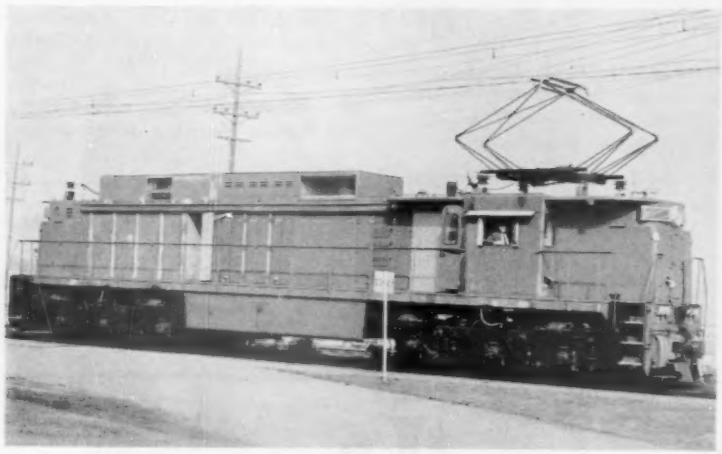
L **Ten-wheeled Locomotive by the Baldwin Locomotive Works.**



Contenders for the Diesel-Electric Throne

In the 31 years since the first practical diesel-electric yard locomotive went into service the internal combustion engine and the electric transmission have displaced steam power—Now several new types of prime movers and transmissions are bidding for a "place in the sun"

Type: Straight-electric



STRONG POINTS: All favorable characteristics of diesel-electric except flexibility. Rectifier converter realizes advantages of a-c transmission and d-c traction motors.

WEAK POINTS: Dependent upon overhead trolley or third rail for power source, thus requiring large initial investment.

STAGE OF DEVELOPMENT: Well established.

Type: Diesel Mekydro Torque-convertor

STRONG POINTS: Efficient over entire speed range. Tractive force characteristics approach smooth curve.

WEAK POINTS: Performance in high speed road service as practiced in United States is untested.

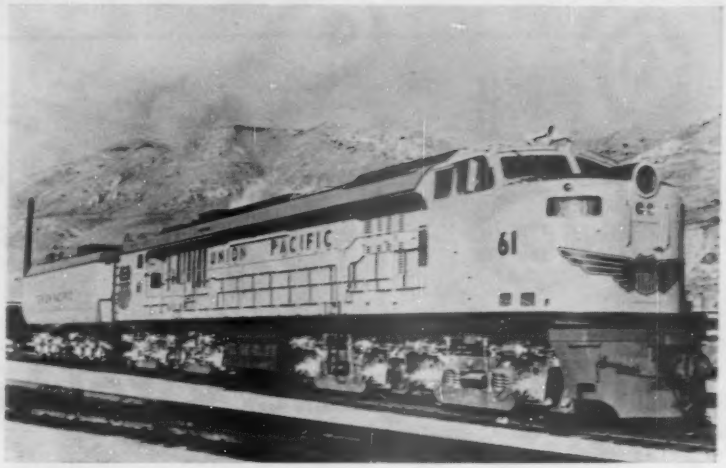
STAGE OF DEVELOPMENT: Unit in switching service and one high-speed, lightweight train.

Type: Oil-fired Gas-turbine-electric

STRONG POINTS. Consumes low-cost residual oil. Dynamic braking. Minimum number of moving parts. Lightweight, compactness.

WEAK POINTS: Efficiency is sensitive to altitude and temperature variations. Inefficient heat engine.

STAGE OF DEVELOPMENT: Extensive testing in regular road freight service.

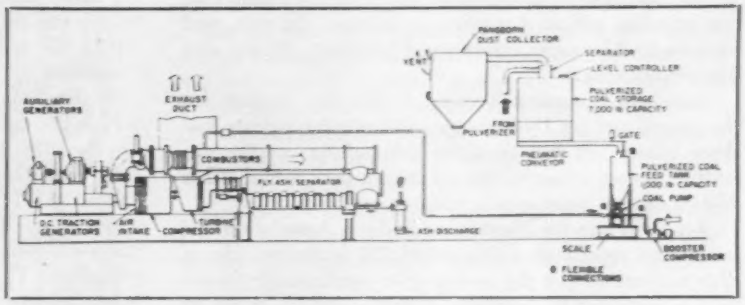


Type: Coal-fired Gas-turbine-electric

STRONG POINTS: Solid fuel. Dynamic braking.

WEAK POINTS: Must haul fuel preparation plant or make relatively frequent stops for refueling at wayside plants. Combustion and turbine blade pitting problems.

STAGE OF DEVELOPMENT: Laboratory.

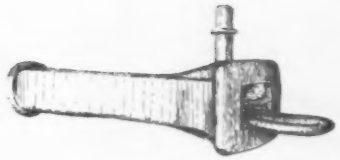


Type: Steam-turbine-electric

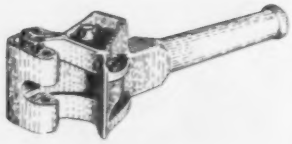
STRONG POINTS: ? ? ? ? ? ?

WEAK POINTS: ? ? ? ? ? ?

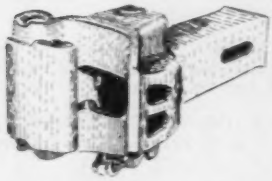
STAGE OF DEVELOPMENT: Experimental unit in service.



Link and Pin



Janney



AAR Standard E—1932
Freight Service

Couplers—The Vital Link

The automatic coupling of cars and locomotives was one of the first problems which produced unified action among the railroads. Safety, and economical, efficient operation were involved. In the early days, the small, light-weight cars were operated in short trains; and simple link-and-pin couplers were employed. Link-and-pin coupling required men to go between the cars, and this resulted in many injuries and fatalities. It was also time consuming.

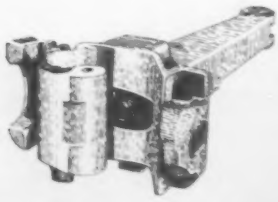
Automatic coupling became a favorite project for inventors, and by 1885 about 3,100 coupler patents had been issued. At that time the link-and-pin coupler was still in almost universal use on freight cars, while Miller hook couplers were widely used on passenger cars.

A year earlier the Master Car Builders Association had adopted a resolution which stated, "It is the opinion of this convention that the best coupler mechanically is one which performs the coupling along a vertical plane so that after it might be generally introduced there would be no further use for the link."

In 1885 the MCB group selected 46 coupler designs as the only ones of sufficient merit to warrant being admitted for test. The result of these tests was to reduce further the number to twelve. The Janney coupler was widely used.

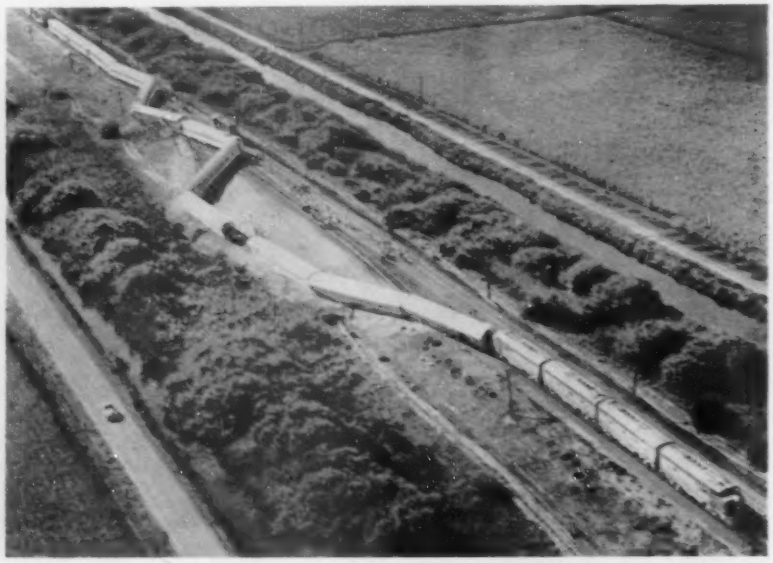
After passage of the Safety Appliance Act in 1893, there was another burst of automatic coupler patents. By 1911 the railroads through the MCB invited all manufacturers to join them in the development of a single standard coupler. The final result was adoption of the Type D coupler in 1916.

By 1931 the AAR Mechanical Division was adopting the manufacturers' improved design which was designated the Type E, superseding the Type D, and this is today's standard. During the 1930's the tightlock coupler was developed for passenger cars. This became the AAR Standard Type H in 1947. The railroads then requested development of a similar coupler for freight service. This has produced the Alternate Standard Type F interlocking coupler accepted in 1954.



AAR Standard H Tightlock—1947
For Passenger Service

AAR TYPE H COUPLER—the tightlock—has done much to convert an entire train into a single unit—illustrated dramatically when one happens to derail. Its performance—lack of free slack and absence of relative vertical movement—brought railroads to call for a similar type of coupler for freight service.



United Press Photograph

A LOOK AHEAD

The locomotive designer will be ready to meet any new design requirements, which will be largely in the direction of automatic functioning of apparatus

By H. L. HAMILTON
Founder, Electro-Motive Company*

Now that we have witnessed the influence of the diesel locomotive on the American railroad system for two decades, a look ahead into the next decade or so could be interesting and profitable.

The diesel locomotive came on the scene as a new tool at the very time when our railway system was badly in need of just what such a new tool had to offer. The effect this new tool had is now very apparent.

The vital importance of our railway trackage and private transportation right-of-way to the country's economy and well-being will be more appreciated in the near future, especially when we begin to experience the cost and disturbance of constructing the new highway system.

If there is any major change either in rolling stock or methods of operation, it must come gradually, "empirically." However, there are apparent many forces, both social and economic, now in motion which will dominate the course of events. One of these forces is the increase of rail traffic-load which will point up the necessity of a much higher usage of existing trackage. It may be pure speculation as to how this problem will be solved. However, there is now another force in motion which could very well have a strong influence on the method.

This force can easily be traced back to our social laws and regulations, necessitating mechanization to supplant manual handling of all products. This is apparent in the current "packaging" idea. The growing use of special purpose railroad cars—even "piggybacking"—can be considered as in the packaging category. The packaging concept in a broad sense stirs the imagination when considering its influence on the design of equipment, terminal facilities, and methods of operation. Cars or running gear designed to fit this new concept could differ materially from the conventional.

A major change could be a substantial reduction in tare weight of cars resulting in reduced buff and drag stresses, and it would seem logical to expect this, in turn, to result in operational changes—such as train makeup and movement to shorten time between terminals and obtain greater track saturation.

One phase of increasing track usage will be reduction of time from the moment a product is available or received until it reaches the final terminal, or is delivered to the next means of transportation.

This all could very well lead to automatic train control and operation. The technical knowledge and apparatus, with modifications, that now exist could provide almost complete automatic main-line train operation, i.e., "dispatcher control from central stations."

Such a reduction in dependence on the vagaries of manual train control would permit greater train frequency and higher speeds. Some trains, possibly, could be multiplied where such operation is desired, each train segment having its own power or locomotive unit.

The present basic locomotive design is not apt to change materially—i.e., individually powered units with internal combustion prime movers using processed fuel. It will not be economic to use any unprocessed or raw, i.e., natural fuel. The present "unit concept" of locomotive design is admirably suited to the foreseeable changes in motive power requirements.

Mechanized handling of LCL shipments at terminals will be a part of this transformation, even to multiple storied structures carefully engineered for the purpose.

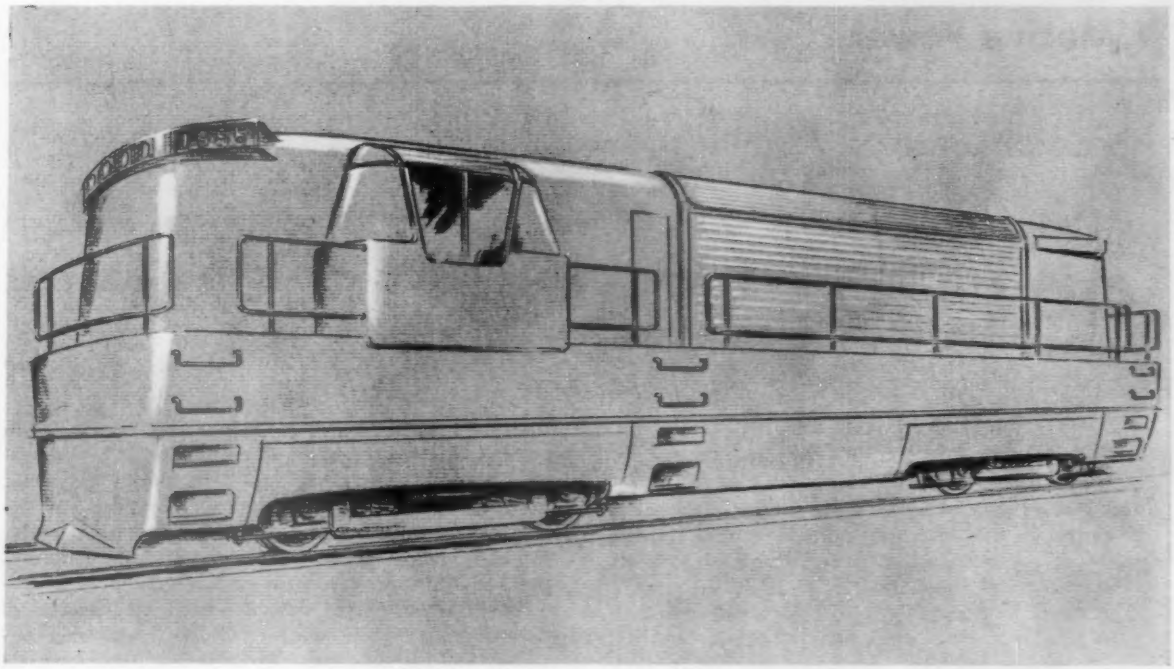
What we can look forward to is a highly mechanized automatically operated ground transportation system—actually a metamorphosis of our present railway system.

*Now Electro-Motive Division of General Motors Corporation, of which Mr. Hamilton is a vice-president (retired).

The Author . . .

As the steam locomotive was reaching a limit in practicable size and tractive force, it fell to H. L. Hamilton—with his almost unique background of motor truck and railroad experience—successfully to apply the internal combustion engine to railroad service, in the gas-electric rail motor car. Others provided the car, the engine, and the backing, but it was his unrelenting belief in his theory of "electro-motive" transmission that eventually brought steam to its knees with standardized, mass-produced diesel-electric locomotive units.

Had Hamilton not proven his theories, "electro-motive" power might have remained shackled to the gasoline engine. Ignoring some 30 years of others' failure in rail car design, he developed his transmission system to its limit and literally paved the way for others to put an economical diesel engine into the combination.



The Locomotive of 1975

By R. A. WILLIAMSON

Manager, Railroad Locomotive Sales
Locomotive & Car Equipment Department
General Electric Company

Trends may be explored in several areas which will serve to indicate the probable direction of motive power evolution in the next two decades. These are (1) refinements in the diesel-electric locomotive; (2) further development of the gas turbine-electric locomotive; (3) evolution of electrification; and (4) the application of atomic power to locomotives.

All must be examined in the light of underlying basic demands of changing times. Our 1956 habits and machinery would fall badly short of adequately serving 1975's doubled business volume. More intensive use of time and material will have to compensate for an increasing shortage of manpower. Physical facilities will be hard pushed to keep up to demands—the nation's life-blood must circulate faster and faster.

In such an economy we cannot afford the luxury of working freight cars only 50 miles per day, or using four hours to traverse a grade which might be run in one. So, in order to keep "in league with the future," tomorrow's locomotives are likely to have greater specific work ability—more horsepower per ton on drivers.

The diesel-electric locomotive dominates the motive scene on North American railroads today. A wealth of talent and experience is being employed in further refining this already very efficient transportation tool, and advancing technology should produce diesel-electric locomotives of 3,000 or 4,000-hp per four-axle unit. For the weights, powers and configurations of locomotive units contemplated, nothing approaching the reliability, economy and usefulness of d-c electric drive has yet been produced. The diesel-electrified locomotive will be in the railroad picture for a good many years.

What The Gas Turbine Offers

The gas turbine-electric locomotive has already established itself as an efficient freight hauler in intensive service. It develops more horsepower per ton than the diesel-power locomotive, and probably will continue to do so. The first production models offer 20% more horsepower per ton on drivers than contemporary diesel-electrics. New 8,500-hp units now under construction push this increase up to 43%.

Gas turbine powered locomotives will be more widely used as their efficiency is increased. Advances in the fields of metallurgy, combustion engineering, and machine efficiency promise attractive benefits. It is reasonable to expect that by 1975 locomotive gas turbines will have for some time equaled or surpassed diesel engines in efficiency. The diesel engine and gas turbine may make a good team. Beginnings of this have already appeared in the turbosupercharged diesel engine. One possible outgrowth of this union is the free-piston gas turbine engine. In such a cooperation between the piston and the turbine we find better theoretical efficiency than can be offered by either alone. The high-speed, high-frequency alternator also teams up naturally with the turbine as a source of useful power.

As horsepower of the prime mover is increased, less torque multiplication is required from the drive system.

"Whatever form the locomotive of 1975 may take, the pattern of active cooperation in research and development already established between the railroads and the locomotive builders assures that it will be the design best suited—economically and operationally—to the job it will have to do.

This opens the way for advantageous application of other transmissions. For example, the characteristics of a-c drive with induction motors resemble those of a mechanical transmission. The electric drive, however, has two important advantages not found in mechanical systems. First, power is easily subdivided among as many axles as necessary without complicated mechanical arrangements. Second, the effect of a 2-to-1 change in gear ratio can be easily obtained by the simple expedient of pole changing in the alternator. This, coupled with the torque characteristic of the turbine, makes a powerful locomotive with a-c drive a distinct possibility.

All this, of course, is still in the future, and will require a great deal of development work to bring it within the realm of actuality.

An Old Friend in New Dress

Turning now to an old friend in a new dress, we find that the straight electric locomotive possesses inherent capabilities unequaled by its internally powered competitors.

At present, electrification is marking time by force of economic circumstances. But even a slight change in the present pattern of fuel and power costs, maintenance expense, and demanded speed of operation could alter the picture sufficiently to again make electrification attractive. A recent study indicated 6% return on additional investment at present cost levels and operating speeds obtainable with the equivalent of slightly less than three diesel units per locomotive. If speeds are increased to those obtainable with four diesel units, the 6% figure goes to over 18%. A 50% increase in fuel cost compared to cost of electricity adds seven more points, while a 50% increase in relative maintenance cost pushes the total return to over 40%.

Recent rapid advances in the development of rectifier equipment promise to affect these factors favorably. The rectifier-type locomotive is comparatively simple and utilizes mass-produced components. Moreover, the fact that it can operate at commercial frequencies permits application of the power of the realm to the trolley system without expensive full-power frequency converting equipment.

Increase in freight traffic over the next 20 years is variously estimated at 50 to 100%. In order to handle this volume efficiently and expeditiously the capacity of our railroads will have to be tremendously increased. One attractive way to obtain increased capacity is to apply more horsepower per ton to trains. In the straight electric locomotive with its short-time overload capacity, we have ready at hand a means of economically improving train performance.

Changes expected in our way of life over the next 20 years affect these factors strongly in favor of electrification as a long time solution to our basic railroad motive power question. 1975 could—and very likely will—see extensive electrifications in place and others under way.

Furthest removed from present reality, yet probably most fascinating of all, is the atomic powered locomotive. Nuclear power has been successfully applied to submarine propulsion, is currently being adapted to surface vessels, and is being studied for possible use on locomotives, and even on aircraft. The operation of an atomic locomotive presents problems that differ widely from those encountered in other applications. Many of these remain to be solved—chief among them being the shielding and size of the reactor.

In applying nuclear power to locomotives the more complicated steam cycles are not appropriate because of weight, space, and complexity. This, of course, points to the gas turbine as the heat utilizer. Therefore, temperatures below 1,200 deg F are not attractive or worth while. Hence, the atomic powered locomotive of the future will probably use gas-cooled reactors. The intermediate coolant can be eliminated, and a non-radioactive gas can be used to drive a flow-gas turbine directly.

Atomic Power Faces Economic Barrier

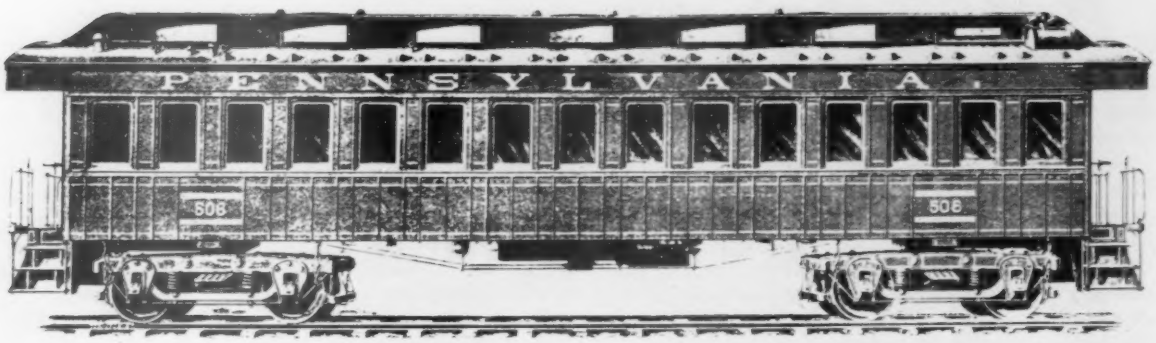
There is the economic barrier. Careful estimates indicate that the atomic locomotive has a long way to go before it can compete on a cost basis with other forms of motive power. Undoubtedly the technological barriers to the construction of an atomic locomotive will be overcome, probably in the very near future. However, the fundamental question is, will such a locomotive be competitive in all respects with improved designs of electric, gas turbine-electric, and diesel-electric locomotives? As far as we can see today, strategic rather than economic considerations will govern, for many years, the construction of atomic-powered locomotives

Further developments of existing forms of motive power, now actually under way or projected for the near future, will probably furnish extremely stiff competition for the atomic locomotive during the next 20 to 30 years at least. It may well be that the first application of nuclear power to rail transportation will come in the form of land-based power plants furnishing electricity to overhead trolley wires. As the economic picture changes, these plants may be subdivided into smaller units and placed on the locomotives themselves.

Whatever form the locomotive of 1975 may take, the pattern of active cooperation in research and development already established between the railroads and the locomotive builders assures that it will be the design best suited—economically and operationally—to the job it will have to do.

Passenger Equipment . . .

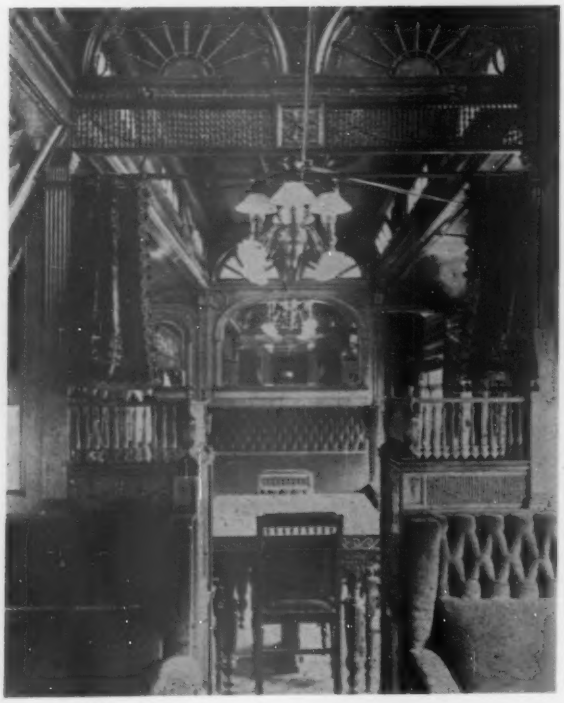
A LOOK BACK



A PENNSYLVANIA standard passenger coach built about 1881. A refined wood structure 52 ft 9 in. long over the end sills, with four-wheel equalized trucks not essentially different in principle from many still in service.

First better materials—then the long struggle for reduced weight and expense, initially *without* and later *with* added patron appeal

FIRST WOOD . . .



. . . THEN STEEL

LOOKING INTO (left) the dining room of a private car built by Pullman Palace Car Company around 1890. Rococo ornamentation was particularly evident in interiors of that period. When steel cars replaced wood in a New York Central observation car, (above) weight and strength became synonymous.

High Spots in Evolution Of the Passenger Car

1831—Bogie truck (Ross Winans).

1840—Compartment car (three sections). Also Hacker car in form of barrel.

1850—Oil lamps superseded candles for lighting.

1852—Reclining seats (W. L. Boss patents).

1854—All metal (iron) passenger car (La Mothe patents).

1858—Pullman's sleeping car.

1867—Pullman's "hotel car" (dining service).

1867—Pintsch gas lamps.

1868—Stoves replaced with hot water heaters.

1871—Straight air brakes came into use.

1872—Water supply carried in separate overhead tanks.

1875—Automatic air brake replaced the straight air brake.

1876—First six-wheel trucks introduced to replace four-wheel trucks.

1879—Paper center, steel tire wheel came into use in place of cast iron wheels.

1880—Steam heating with steam from locomotive.

1887—Narrow enclosed vestibule applied.

1891—First attempt made to apply antitelescoping construction to ends of cars.

1893—Air pressure water system installed to replace overhead tanks. Wide vestibules applied to cars.

1899—First axle generators and storage battery systems for car lighting came into general use. New type of cast iron center, steel tire wheel introduced. Diaphragm connections between vestibules added.

1900—Part steel underframe, consisting of steel channel center sills and cast steel platforms but maintaining truss rods. Entire steel underframes, some with cast steel platforms and others with built up steel platforms, were being developed.

1905—McKeen gasoline rail car.

1908—Modern vapor heating systems came into use. First all-steel cars constructed and cast steel truck frames applied.

1910—Practice of steel sheathing old wood superstructure cars came into use to provide greater safety, particularly from fire. Improvements in antitelescoping constructing of ends.

1912—Post Office specifications for car strength issued, resulting in stronger underframe and end structure. Solid wrought steel wheels came into general usage to replace the steel tire wheel.

1917—Clasp brakes, having two brake shoes per wheel, came into use to replace the single shoe type, to get better braking effects. Self locking center pins, to hold the truck to the car body in case of accident, developed.

1924—First St. Louis-Brill gasoline rail car.

1930—Air conditioning introduced.

1934—Lightweight, articulated, diesel-powered trains.

1947—Modern dome car.

1949—Rail diesel car.

1954—High-level cars.

1955—Ultra lightweight, revolutionary trains.

A DREAM MADE REAL

A PARTIAL APPROACH to the dome idea was conceived by the Canadian Pacific in 1906. The full conception was achieved in 1945 with General Motors' Astra Dome. Many dome cars have since been built by several builders.

The Coach Passenger Discovered

THE COACH RIDER got a break in the 30's. The all-coach "Silver Meteor" Seaboard Air Line train between New York and Florida set the pace for a growing practice. Revenue per train-mile was favorable to the railroad.

A COFFEE-SHOP car in the Pennsylvania daylight "Congressionals" built in 1952 is attractive to coach passengers.

A PROTOTYPE of the smooth-riding "Hi-Level" chair cars, dining car and dome-lounge car of the Santa Fe all-chair car Chicago-Los Angeles "El Capitan."

Passenger Equipment . . .

A LOOK AHEAD

ASKED for his views on the future passenger car as an "outside and independent authority," the author here jumps forthrightly into highly controversial questions. Following this statement of his views are commentaries thereon by the several builders of passenger cars.

By HERMAN BLEIBTREU
Consulting Engineer

There are four basic minimum objectives to be kept constantly in mind as we think about what path passenger car design should follow during the next ten years, viz., trains must be **lighter, faster, cheaper, and more comfortable.**

LIGHTER means lower weights per seat and foot of car length, resulting in lower fuel consumption and eventually

also in lower first costs. Yet, it is a virtue only as long as it can be reconciled with the requirements of high collision strength and low first cost.

FASTER does not mean necessarily higher top speeds, but it means higher average speeds obtainable (1) by lower center of gravity and other means of allowing higher safe speeds in curves, and (2) by lower weight.

CHEAPER means lower servicing, maintenance and operating costs as well as lower first costs.

For passengers to feel *more comfortable*, we must make the car quiet, not just smooth-riding.

Basically, we have three types of passenger cars: the long swivel-truck car; the single-axle articulated type like "Talgo" and "Train X"; and the two-axle car like the "Aerotrain."

Swivel truck cars offer the least weight and cost savings. While they can be built more than a third lighter and a fourth cheaper than conventional cars, the saving is less than with the two types of short-car trains. On the other hand swivel truck cars have the advantage of superior riding qualities. The long swivel truck car is therefore predestined for long-distance trains, particularly so if they consist of dome cars of the land cruiser type. Here, first costs are a secondary consideration in view of the high daily mileages and revenues.

Short-car articulated trains are a definite step ahead as far as weights and first costs are concerned, if they can be built on a production basis. Their original drawback—lack of divisibility— can be overcome as was done with the Rock Island's "Jet Rocket," where three-car units can be cut in or out like ordinary cars.

The two-axle car also has possibilities in intercity service if riding qualities can be improved. Its main field, however, seems to be suburban service, where its low first costs are particularly attractive.

More Weight, Less Cost

Modern lightweight car design conceives of the car body as a monolithic hull in which underframe sides and roof form a tubular structure of high compression, bending and torsional strength.

In the "Aerotrain," the car body and car underframe are two independent components, as in many buses. The underframe takes up all forces and movements without being aided by the body. While this requires the underframe to be heavy, it permits the bodies to be built very light and cheap, following automotive production methods. This construction may also make it economical to replace the bodies after a few years by more modern or more appealing structures, and before maintenance costs increase. The weight per seat will not be much lower than that of lightweight, swivel-truck cars.

Here is a typical case in which some weight savings must be sacrificed in the interest of low first costs. The objection that light and independent bodies may collapse or shear off the underframe in case of collisions could probably be overcome by certain structural reinforcements.

There may be also a third solution, in which the body is built up from prefabricated tubular sections rigidly welded or riveted to the underframe, or reinforced lengthwise at all four corners by horizontal members. In either case a monolithic structure would be obtained.

It appears that the weight savings from light metals become smaller as cars get longer. Beyond a certain length the section modulus of the body is determined by the vertical deflection, not by the permissible stresses.

Underslung trusses should be considered to increase the section modulus without increasing the weight. Such trusses would also be preferable to conventional suspension for mounting of auxiliary equipment.

Running Gear Goals

To determine the course that running gear design should follow over the next decade, it is perhaps best to start with those elements common to all three categories of passenger car design. Pivoted journal boxes are used under many European cars and under the "Aerotrain." They eliminate any longitudinal play between journal box and pedestal and are known to be effective means of suppressing "sinusoidal" side motions ("shimmy") which are most disagreeable, particularly at high speeds.

Pivoted journal boxes reduce pedestal wear and, in some designs, eliminate it by omitting the pedestals.

By omitting pedestals, side play can be made greater, and heavy side blows can be taken up smoothly without transferring them to the truck frame. In the case of swivel truck frames, the side blows would be kept away from the bolster and the truck frame would be less inclined to deviate from its longitudinal direction.

Another help in suppressing sinusoidal motions is free wheels as used under the original "Talgo" and the "Jet Rocket." One weak point of loose wheel designs—the high and not altogether dependable electric resistance of the bearings to signal currents—can probably be overcome without too much difficulty. Another problem of loose wheels is excessive flange wear.

Whether the advantages of air springs over coil springs are such that their additional and rather involved control mechanisms can be justified is still an open question. Eventually a combination may be in order—coil springs assisted by air helper springs, which also act as dampers.

In the case of swivel trucks the goal must be lighter and simpler designs, while riding qualities must not deteriorate with the wear of wheels, liners and bushings. A step in this direction may be the new Budd truck with independent side frames.

If bolster springs are to be retained, the question of the best truck bolster suspension must be studied. There are now three basic methods: The swing hanger suspension, (preferably with outside swing hangers); that with cross-equalizers as built successfully for years and which reduces car body roll; and the suspension now employed in certain Electro-Motive diesels, where the laterals are taken up by the horizontal resistance of bolster coil springs.

Much will depend here on the question whether the banking or leaning action obtained by the trapezoidal swing hanger suspension really adds much to travel comfort while negotiating curves—whether the car should be banked into a curve, and if so, to what degree.

A fourth possibility is the strut support, as employed on "Train X" and the original "Talgos." In these cases as well as in that of the "Presco" pendulum suspension cars, the point where the body rests on the struts or the springs is at or above the level of the center of gravity. In this banking any desired degree can be obtained.

All short-car articulated trains have radially guided single axles except the original "Talgo" and one German train with two-axle swivel trucks. Here attempts are to simplify the guiding mechanism and to eliminate rubber bushed joints. Radial guidance is necessary as we have been

led to believe in view of the apparently tolerable riding qualities of the rigid axle guidance of the "Aerotrain" cars.

There remains, however, the problem of how to eliminate the side motion with which two-axle cars "fight" the curves. There seem to be promising, but not practically proven, remedies.

Still another question is whether, for short, high-speed cars, two-axle swivel trucks will not be the final answer. In the case of aforementioned German short car trains, the riding qualities were found to be as good as on the best riding swivel truck cars of conventional design. Furthermore, the ride did not deteriorate as on its single-axle sister train. Yet these swivel trucks did not weigh much more than the single-axle trucks.

Car design and motive power cannot be considered independently of each other since the motor train has appeared on the scene. Currently there are two types which have found general acceptance. The one used here is the RDC, where each car is powered by horizontal diesels mounted under the car floor between the swivel trucks. Its advantages are maximum flexibility and no loss of revenue space from the engines.

The type used extensively in Europe likewise has advantages. It is a three car unit with a power car at one end and pulling or pushing two trailer cars. Each unit has a driver's cab at either end, permitting operation in both directions. Units of this kind can be coupled to form trains with from 6 to 12 cars.

Comparing the two types, the European design has the disadvantage of smaller revenue space, which however does not mean that the first cost per seat will be necessarily higher. Advantages of the second type are fewer servicing points and that servicing can take place inside of the cab without exposure to inclement weather. Furthermore there is less exposure of the passenger to engine noise and engine vibration. Another good point is that the same diesels can be used as on locomotives.

What's Ahead in Passenger Cars

JOHN R. FURRER
Director, Product Development
ACF Industries, American Car & Foundry Division

Some have predicted that with the successful development of long range jet or turboprop aircraft, it is likely that long-distance overnight rail travel will continue to dry up. The major portion of the travel remaining in this category would then be for the purpose of seeing the country or vacationing, rather than for commercial reasons. Under these circumstances, expensive luxury landcruiser type equipment as manifested in the dome cars may be justified, particularly in view of the high utilization and revenue factors.

Assuming a vast expansion of the superhighway systems as well as continued improvement of aircraft, it is still conceivable that the railroads have an important role to play in medium haul traffic. Aircraft transportation is still subject to weather delays and the superhighways to an ever-increasing accident and travel fatigue rate.

Our ever-increasing population, combined with a definite tendency toward the suburbs, assures a high volume business in the commuter or short-haul field

It would appear, therefore, that if volume of business is an index to the railroads' problem, the most important areas of study from the carbuilders' standpoint should be directed toward daylight equipment of the short- and medium-haul variety.

Equipment for These Objectives

• **Car-body design.** A reappraisal of car-body design has been in progress during the past two years with an objective of reducing car weight. The major portion of this activity has manifested itself in equipment of the short-unit type pioneered just after World War II with the building of the first ACF "Talgo."

Many people agree with the short-unit philosophy; namely, that cars of this type can weigh less without sacrificing strength and can potentially be built for less, particularly in production runs. There are those who feel, however, that the advantages of the short-unit concept are offset by the disadvantage of a greater number of ends, couplers, etc., per train.

After only a few years of development in this field, however, is it not too early to rule out the shorter unit as the car of the future? With lighter weights a recognized objective, certainly the shorter unit can play an important role if initial cost is to be reduced and the tendency to buy less expensive equipment at more frequent intervals is to be accepted.

New materials can, and must, play an important role during the next ten years of car building. We have already seen a significant tendency toward the use of plastics in interiors. During the next ten years we may witness the use of plastics for exteriors as well as their wider use for some important structural members.

The experience available with head-end power equipment has already substantiated the expectations of its adherents. New equipment, where sold and operated in consist form, should further expand the use of this medium.

A secondary advantage of head-end power is the possibility of using a-c equipment in place of the premium-priced transportation equipment now generally used. Why should the car builders and the railroads pay premium prices for special design equipment when mass-produced equipment may be adequate? The next ten years should reflect a tendency toward a reduction of specialty equipment costs by simplification of design as well as by wider use of mass-produced components.

• **Truck design.** The original ACF "Talgo" built for operation in Spain started a trend toward single axle equipment in 1949. During the past two years sev-

eral European carbuilders, as well as American builders, have come forward with different manifestations of this concept. Certainly no one would doubt the potential cost and weight advantages of suspending railroad vehicles over two-wheel trucks as opposed to four-wheel trucks.

Critics of the single-axle system have stated that single-axle trucks do not tend to ride as well as two-axle trucks. They also point out that single-axle trucks, particularly as applied to the longer cars, require radial steering which potentially reduces interchangeability with conventional equipment.

Is it, however, not too early for critics to say that the single-axle truck cannot be made to ride as well or better than the best conventional equipment on the rails today? Is it not also too early to say that systems for controlling single axles without specialized steering methods can, or will, be evolved during the next ten years?

During the relatively short period of concentrated activity in the field of single-axle railroad suspensions, much progress has been evident. Many of the advantageous principles already established for single-axle suspensions can, and are being adapted for use on four-wheel trucks. It has certainly become evident from the work already done that even the four-wheel truck design can be greatly simplified, thereby achieving lower cost, lighter weight, and reduced maintenance.

Technological advancement has caught up with the railroads and a certain inevitable "leveling off" has been experienced. Is it not true, however, that the promising economic picture, combined with a growing population and a trend toward the suburbs, would make it equally inevitable that the railroads can, must and will play an increasing role in the nation's passenger transportation system? Certainly, the established traffic-controlled railroad rights-of-way are in themselves a competitive advantage which may well become more pronounced as automobile registrations vs. population continue to pyramid. The air industry, meanwhile, is heading into the jet age which will seem to foreshadow longer, rather than shorter, haul business.

Four Objectives — Three Solutions

THOMAS C. GRAY
Vice President-Engineering
Pullman-Standard Car Manufacturing Company

The changing scene in transportation not only forces—through economic pressure—a striving toward the objectives enumerated, but actually defines in a broad sense the kind of equipment which will best serve future requirements.

The four basic objectives are well chosen; however, there are many important comfort factors. For passengers to feel more comfortable, we obviously must do a great deal more than improve noise level and provide a smoother ride. For example, adequate illumination, comfortable seating, good temperature control and pleasant interiors are all elements contributing to passenger satisfaction.

One basic and vital objective which should be included is maximum standardization to allow volume and economical production inviting to the carbuilders. Further, the use of remote auxiliary potential with resultant minimizing of much repetitive small-volume-produced equipment on cars should be considered of sufficient importance to be classed as one of the basic objectives of the modern train.

Statements that swivel truck cars offer a superior ride but the least weight and cost savings can now be questioned. With properly maintained track, "Train X" provides a superior ride and the truck of the Budd Company's "Pioneer III" appears to challenge the theory on weight and cost. With the present state of the art, swivel trucks obviously lend themselves to relatively heavy dome car design. We can see no particular limitations to the two axle car pursuant to long hauls.

"Train X" may have cars added or subtracted as desired. The desirability of heavy underframe design permitting light bodies for replacement after a few years by "more modern or appealing structures" is questionable. Such a superstructure is not safe for many of the roll-over or collision type wrecks that we have experienced in this country. It is necessary to sacrifice some weight savings to attain a safe and satisfactory structure.

The third solution in which the body is built up of prefabricated tubular sections and rigidly secured to the underframe does not readily lend itself to minimum weight and desirable production methods.

Car weight per seat does not necessarily diminish with decreasing car length and 35 to 40 feet is considered too short for acceptable design. Minimum weight defines light metals. Design weight is a direct function of section modulus. The proposed underslung trusses are not acceptable design to our way of thinking. Further, we have endeavored to keep the "belly" of the car as clean as possible with all equipment within the car and away from the weather.

Air springs are only justified by their inherent ability to do things that the conventional coil spring cannot do. The banking or leaning action on the "X-Plorer" has well demonstrated the desirability of this feature. We are also of the opinion that proper radial guidance is highly desirable. The motor train, where each car is powered, appears economically questionable by virtue of the multiplicity of parts.

There is a need for more cooperative research. There is no doubt but that it is most desirable for the railroads and builders to agree on a number of fundamental points. However, this has been most difficult as witnessed by the fact that the lightweight train committee set up by the New York Central and others, which studied every potential design in this country and Europe, could not agree upon a single basic train design.

Light Weight May Not Be the Answer

By ALBERT G. DEAN
Assistant Chief Engineer
The Budd Company

This year will see the culmination of more diversified development work on railway passenger car design than any time since the introduction of steel cars. These developments range from refinement of orthodox details, through bold redesign based on proven principles, to radical application of new principles including various combinations of all three. Costly experimental trains and cars will be in service by the end of the year, permitting a realistic evaluation without undue reliance on opinion or speculation.

We question the practicality or desirability of building a self-supporting underframe with a body which will be replaced after relatively short service. There is little to become obsolete in a coach shell, and on rare occasions when it is desirable to make changes they can be made at less cost than replacing the entire body. It is preferable in this case to use materials providing minimum maintenance over a long period of time.

During this important "year of decision" the Budd Company has developed a wide variety of new equipment, including the Pennsylvania's tubular train, the "Keystone"; the Santa Fe's new "Hi-Level El Capitan"; the Burlington's new "Denver Zephyr" featuring the coach sleeper; the Baltimore & Ohio's three-car RDC trains; the New Haven's six-car "Flying Cloud" of modified RDC's, and our "Pioneer III."

In all of this equipment we have retained the standard 85-ft car length and the four-wheel swivel truck. The widely differing designs of the structure of this equipment have been predicated on the type of service for which it is intended.

We do not agree that short cars equipped with single axle trucks represent the ultimate in weight and cost savings. And the superior riding qualities of four-wheel trucks are generally acknowledged. The 85-ft "Pioneer III," seating 88 passengers and weighing 52,330 lb, or 595 lb per seat, is the lightest car meeting standard strength requirements yet built. In addition to its low first cost, the simplicity of its mechanisms and body construction indicates it should afford the maximum operating and maintenance savings.

Price comparisons will become significant only when it is known what must be done to make the single axle truck ride satisfactorily, and when firm quotations are made for a considerable quantity of cars to perform a given service. The principal impetus which can be given to low first cost is a moderate degree of standardization and reasonably steady production. Low maintenance cost, including long life, should not be sacrificed for low first cost.

There must be no compromise with comfort and safety, the two features that are of the greatest concern to the passenger. Furthermore, in addition to the consideration of "first cost," maintenance and operating costs as well as maximum utilization must be considered.

By the time a superstructure is sufficiently reinforced and adequately attached to an underframe to provide present minimum standards of safety, it becomes a monolith. During manufacture the floor system of a monolith is still strong enough to support its own weight and, with occasional temporary bracing, its own weight and that of all the underfloor equipment which is convenient to mount before assembly to the rest of the body.

Provided equal strength under lateral loading or roll-over conditions is maintained, the minimum weight per seat will be realized with the longest car body—at least up to 85 ft. There are fewer end frames, draft gears, end platforms, etc.

It is not logical that different materials will be most effective in different length cars, other things being equal. The deflection of a car body is in proportion to the effective *EI* (product of modulus of elasticity times moment of inertia) and the weight. The moment of inertia (not section modulus) is sufficiently high in almost any case. Refinement of design to minimize shear deflection will keep deflections within reasonable limits on an 85 ft car. This holds true for either steel or light alloy. We believe stainless steel is preferable for minimum weight and minimum maintenance cost and maximum impact strength.

The greatest potential for high moment of inertia is the car shell itself. Underslung trusses would seem to be less efficient disposition of material.

"Shimmying" of running gear is a function of many variables and can therefore be suppressed in a variety of ways. The most effective way we know of is the use of controlled center plate friction.

Banking devices are an interesting principle, but side sill clearance conditions prevent utilizing the principle more than partially. It is not effective under nosing conditions where the two ends want to bank in opposite directions. Can the pendulum system react fast enough to compensate for sudden accelerations?

The advent of the "Pioneer III," refutes the premises upon which an argument for short cars of unconventional single-axle running gear is based. Adequate strength to protect passengers in case of accident designs the main longitudinal members of the car construction regardless of the length of the unit. If these main members are coordinated into an efficient unified structure bending loads even in a long car body are carried with extremely large factors of safety.

The number of axles per foot of car body length is much the same in a long car body using swivel trucks as in a short car body using single-axle trucks, while the recognized advantages of good riding qualities and safety at high speeds of the four wheel truck are maintained.

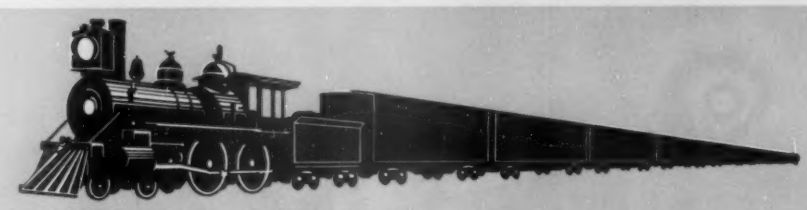
With the new truck which we designed for the "Pioneer III," we have retained these advantages, and at the same time reduced weight drastically. This truck weighs approximately 6,500 lb as compared to standard four-wheel trucks which weigh about 18,000 lb.

A 100-Year History of Our Railroads – well told

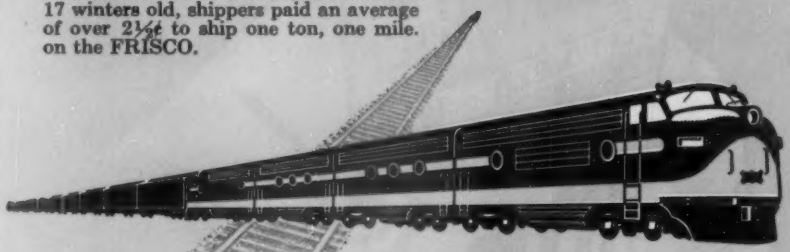
Congratulations
FROM
W. H. MINER, INC., CHICAGO
SINCE 1894

Milepost of 96 Years of

In 79 years, progress on the FRISCO has cut shipping costs almost in half!



IN 1877, during the Civil War Reconstruction Period when FRISCO was but 17 winters old, shippers paid an average of over 2¼¢ to ship one ton, one mile. on the FRISCO.



TODAY, 79 years later, as FRISCO at 96 years of age approaches its own centennial, the average cost to ship one ton, one mile, on the FRISCO is 1⅜¢—almost half of what shippers paid in 1877!

1877—$0.0257 average per ton mile

1956—$0.013 average per ton mile

Today FRISCO and the nation's other railroads (that make up the world's largest transportation network, extending over 225,000 miles in length) *move more tons of freight more miles* than all other forms of transportation combined!

The nation's railroads perform this gigantic job of hauling America's raw materials and finished products from mines, forests, fields and factories to markets at charges which *average less* than those of *any other form* of general transportation!

Fast, low-cost FRISCO transportation works hand-in-hand with Agricultural and Industrial America, so that all of us may continue to enjoy the conveniences and necessities that provide America with the highest standard of living in the world!

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FRISCO'S $200,000,000.00 Modernization is providing *Finer* Rail Service For Shipper and Traveler alike!

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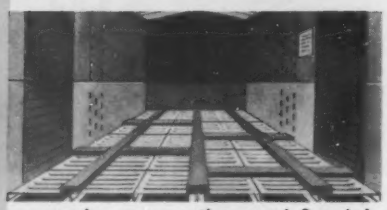
Swift streamlined passenger trains

Centralized Traffic Control

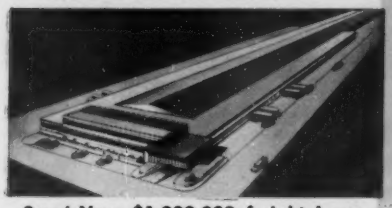
New ballast, new ties, new rails

New Product and Material Testing-Research Laboratory

... and more to come! "Damage-Free" GARX box cars.



... and more on the way! Special steel-floored box cars with nailing grooves.



Soon! New $1,000,000 freight house at Memphis.

Soon! New Electronic Hump Classification Yards at Memphis and Tulsa at cost of $16,000,000.00 will speed up terminal handling.

Today and tomorrow, progress will be moving swiftly through 5000 miles of the Southeast and Southwest because

***IT* TRAVELS ON THE FRISCO!**

FRISCO

5000 miles serving:

TEXAS • TENNESSEE • MISSISSIPPI • ALABAMA • FLORIDA

44 Years of Weed Control Service

. . . and we look forward to *our* one hundredth year!

During the years we have been serving railroads, our facilities have developed to enable us to render nation-wide service. The emblems indicate some of the leading railroads currently using our weed killers. This representative group is evidence of the widespread acceptance of our chemicals.

CHIPMAN CHEMICAL COMPANY, INC.

Chicago, Ill. • Bound Brook, N. J. • St. Paul, Minn. • N. Kansas City, Mo.
Pasadena, Tex. • Bessemer, Ala. • Palo Alto, Calif. • Portland, Ore.

Manufacturers of Chemicals for Railroad Weed Control Since 1912

REMEMBER THE TIME—

Mack Sparkled Afield for Tribe

Ray Mack wore a magic glove while performing at second base for the Indians in the '40s.

Never a great hitter, Mack compensated for this with his brilliance afield. He possessed a cannon in place of a right arm and executed the doubleplay with incomparable finesse.

Never was his talent so fully exploited than in Feller's opening day no-hitter against the White Chicago's Comiskey Park in 1940.

With two outs in the ninth and Feller one m immortality, Taft Wright, an outfielder, the first base line. Mack raced the grou

You'll cheer, too, when you see the newest star in the materials handling big leagues . . . the Wellman Locomotive Crane. In its first few months of action, this power-packed performer has won fans by the hundreds among men who specify in steel plants, railroad terminals, scrap yards, paper mills. And no wonder! The new Wellman Locomotive Crane offers these outstanding features:

BALL RACE ROTATION... eliminating center pin construction, delivering smoothest operation.

TORQUE CONVERTER DRIVE... combining diesel electric power with hydraulic torque conversion.

POWER-POSITIONED A-FRAME... positive, simple adjustment of crane bail for heaviest loads on extra long booms.

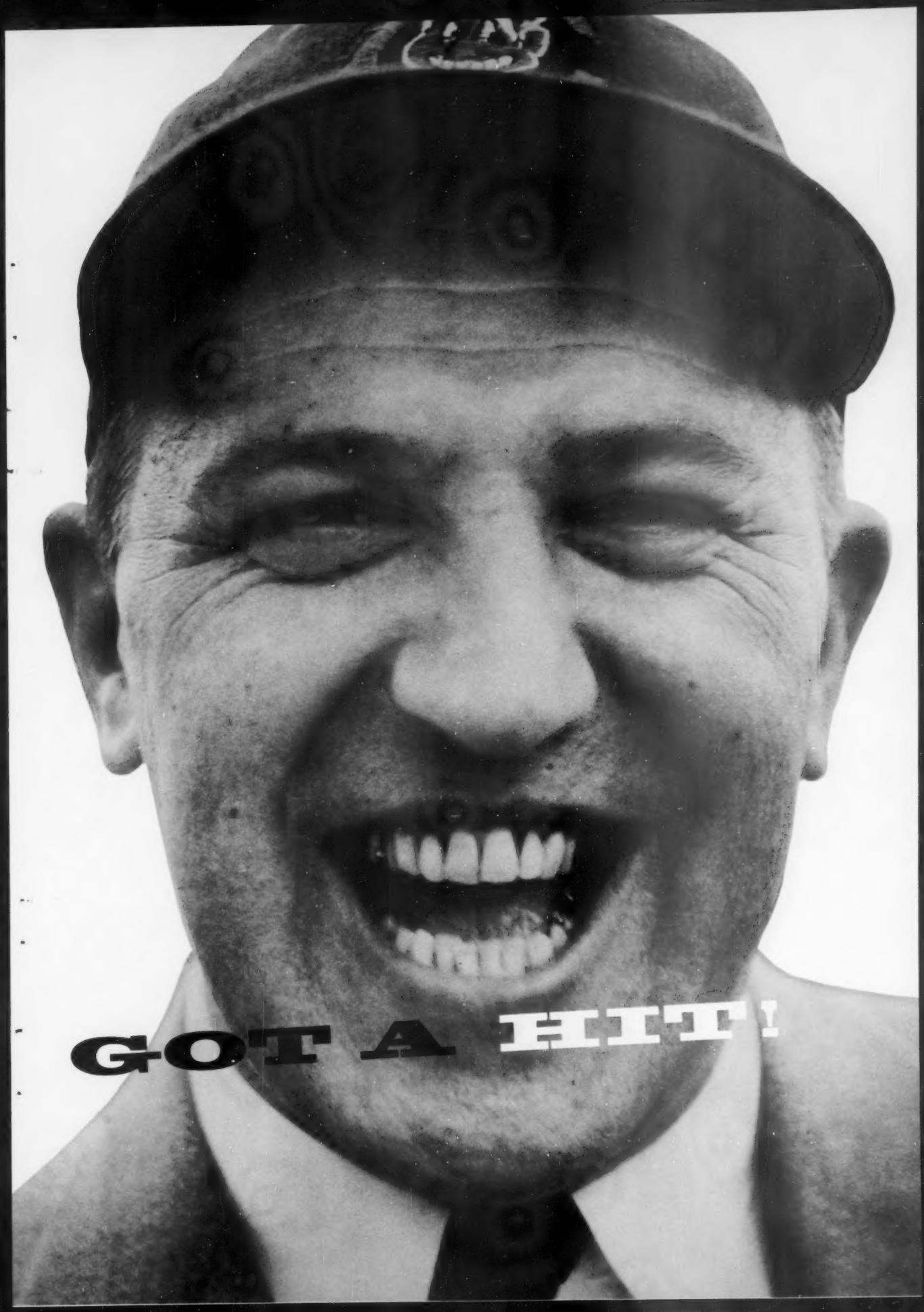
PLUS CAPACITIES FROM 25 TO 80 TONS... speeds to 15 miles an hour... extra-full-vision for operator... true air-powered brakes on hoist drums... push-button control for main disconnect clutch... all anti-friction bearings... many more exclusive features.

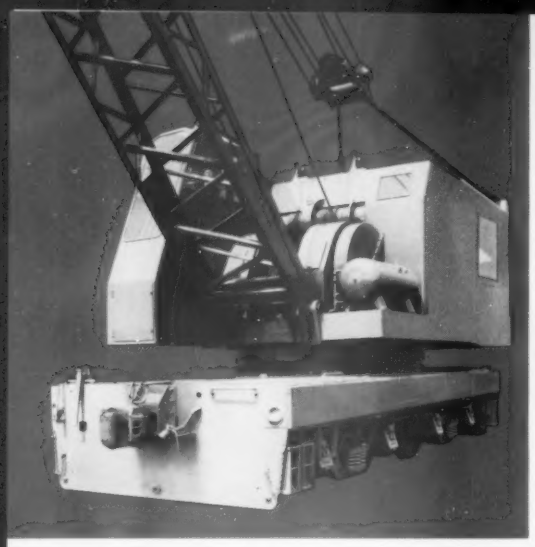
Ray Mack, former star second baseman for the Cleveland Indians, is a vice president of The Wellman Engineering Co. and general manager of its Locomotive Crane Division. His ten years in baseball began in 1938, the year he graduated from Case Institute of Technology in Cleveland as a mechanical engineer.

RAY MACK'S

Ray Mack will be at the Track Supply Show in Chicago's Coliseum from September 17 through September 20. Look for the man with the biggest grin . . . and the finest locomotive crane ever built.*

**BOOTH 44-N*


GOT A HIT!



WELLMAN LOCOMOTIVE CRANES*

*SUCCESSORS TO BROWNING LOCOMOTIVE CRANES

Engineered and Built for Railroads . . . Steel Mills . . . Pulp and Paper Plants Scrap Yards . . . Terminals and Ports . . . Sand and Gravel Plants

The Wellman Engineering Co., now in its 60th year of service to basic industry, also produces complete heavy bulk materials handling plants and systems . . . steelmaking machinery . . . heavy hoisting equipment . . . the complete line of Williams contractors clamshell and dragline buckets and special industrial buckets . . . Anker-Holth air and hydraulic power cylinders in standard and special sizes and designs.

a McDowell enterprise

LOCOMOTIVE CRANE DIVISION
THE WELLMAN ENGINEERING COMPANY
7000 CENTRAL AVENUE · CLEVELAND 4, OHIO

THE McDOWELL FAMILY OF RELATED ENTERPRISES

McDowell Turnkey Plants • Dwight-Lloyd Research Laboratory • Wellman Bulk Materials Handling Systems and Steelmaking Machinery • Anker-Holth Power Cylinders • Dwight-Lloyd Ore Beneficiating Plants • ABCs Belt Conveyor Scales • Williams Buckets • Wellman Locomotive Cranes

Locomotive Crane Division
The Wellman Engineering Co.
7000 Central Ave., Cleveland 4, Ohio

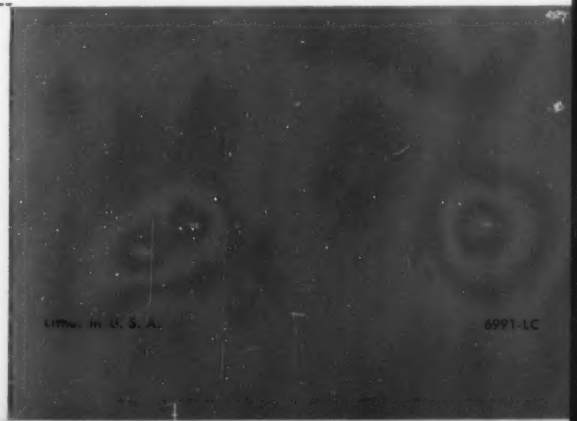
Please send BULLETIN WL-201 describing the new Wellman Locomotive Cranes in detail.

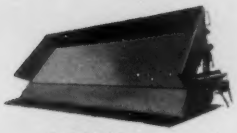
NAME ..... TITLE .....

COMPANY .....

STREET .....

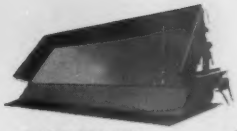
CITY ..... ZONE ..... STATE .....





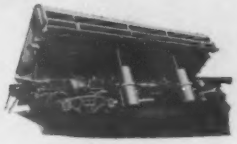
DITCHING

CUT WIDENING



SHOULDER FILL

magor

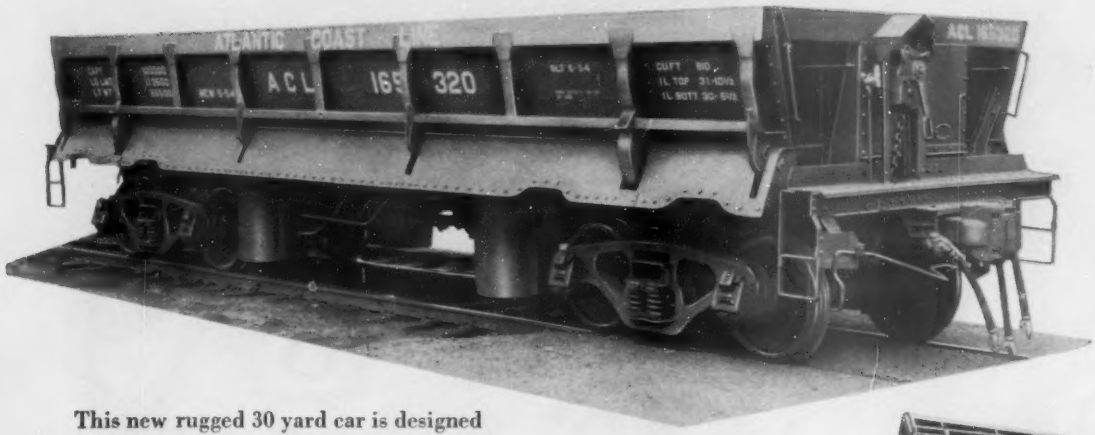


RIP RAP

fast
efficient
low cost

maintenance of way operations

WASHOUT SERVICE



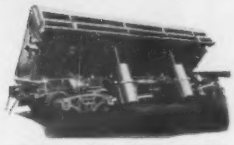
This new rugged 30 yard car is designed to speed up work and slow down rising costs.

Whether it's snow removal or construction work, MAGOR automatic air dump cars offer unsurpassed dependability combined with a new low in maintenance costs.

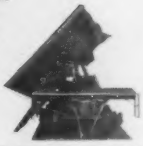
Cutting work train costs is but part of the story. Years of research, experience in working with many of America's roads, field tests and top engineering skill are incorporated into each MAGOR car.

It is this background which enables MAGOR, the world's largest producer of air dump cars, to manufacture equipment designed to save you time, labor and haulage costs.

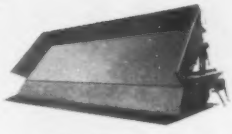
Write for information and specifications.



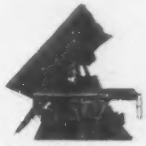
TERMINAL WASTE DISPOSAL



TIE AND RAIL HAULING



SNOW REMOVAL



CONSTRUCTION WORK

MAGOR

MAGOR CAR CORPORATION
50 CHURCH STREET
NEW YORK 7, NEW YORK

NEW ALCO
DL701
DL701
ALCO

LOCOMOTIVES OFFER INCREASED VERSATILITY, IMPROVED RETURN ON MOTIVE-POWER INVESTMENT

Simple Design, Rugged Construction Provide Maximum Performance In ALCO's New 900 hp, 1800 hp and 2400 hp All-Purpose Diesel-Electrics

You get maximum locomotive performance at minimum investment cost when you choose from ALCO's new line of higher horsepower diesel-electric locomotives. Each model, tailored to your basic needs and offering far greater power and versatility, is equipped with the recently developed ALCO Model 251 diesel engine.

Engineered and manufactured by ALCO, the new locomotives incorporate many of the most important developments in locomotive design. New features, including larger cabs, dynamic braking, roller bearings, static excitation system, control and gauge arrangements enabling convenient operation in either direction, plus many other innovations, give you increased efficiency and lower maintenance costs. A wide range of modifications and choices of gear ratios are available.

Operational versatility with the new ALCO diesel-electrics has been advanced far beyond any previous performance standard. Continuous operation for long periods of time on a variety of assignments is now possible. Units are used for jobs requiring power, quick, easy movement and reliability with no loss of performance time.

ALCO's new higher horsepower Model 251 diesel engine, installed in the new locomotives, has had two years of use in regular road service, as well as three years of laboratory testing. It includes many new engine design features which provide higher performance standards, longer service life, and substantial reductions in engine maintenance.

For information on these new locomotives, or for a complete survey of your motive-power requirements, consult your ALCO representative or write to P. O. Box 1065, Schenectady 1, New York.

ALCO **ALCO PRODUCTS, INC.**
NEW YORK
Sales Offices in Principal Cities

Four newly designed, higher horsepower ALCO diesel-electric locomotives—left: DL-701, 1800 hp 4-motor road switcher; above left: DL-600, 2400 hp 6-motor road switcher; above right: DL-430, 900 hp switcher; below: DL-702, 1800 hp 6-motor road switcher. ALCO also produces freight "A" and "B" units with new Model 251 diesel engine.

the JERSEY CENTRAL

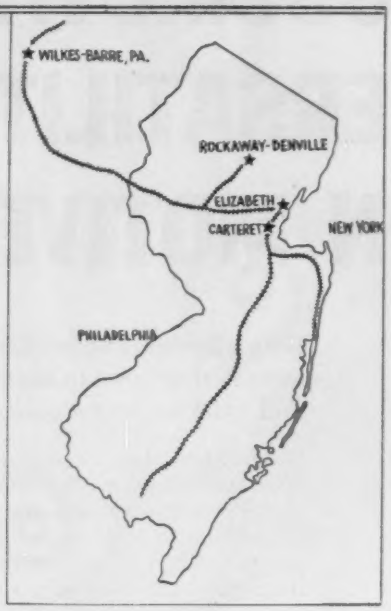
. . . . A Progressive Pioneer

(LIKE RAILWAY AGE)

OFFERS INDUSTRY

"Planned Sites"

IN FOUR ★ STRATEGIC AREAS



CRESTWOOD INDUSTRIAL PARK—1,500 acres adjacent to main line. Near Pennsylvania Turnpike Extension. In Federal "Labor Surplus" and "Tax Amortization" area. Community financing available. Suitable for all types of industry.

SCRANTON

WILKES-BARRE

WILKES-BARRE, PA.

ROCKAWAY-DENVILLE

CENTRAL MORRIS INDUSTRIAL PARK—260 acres in N.J.'s "lakeland" area. Daily freight service. On U.S. Route 46. Near metropolitan markets. All utilities. Plants built to suit on lease or purchase basis. For light and medium industries.

NEWARK

NEW YORK

ELIZABETH

ELIZABETH CENTRAL DISTRICT—1,200 acres in New York's "front yard". All-day freight service. Adjoins N.J. Turnpike, U.S. Routes 1 & 9, Newark Airport, Port Newark. Deep water sites available. All utilities. Plants built to suit on lease or purchase basis. Suitable for all types of industry.

CARTERET INDUSTRIAL CENTER—180-acre site ideal for light manufacturing. Daily freight service. On N.J. Turnpike at Interchange No. 12. All utilities. Plants built to suit on lease or purchase basis.

CARTERET

IN JUST the last five of its 107-year history, Jersey Central Lines has attracted 225 discriminating industries to sites along its right-of-way. Recent co-developer of the four planned industrial communities shown on this page, Jersey Central offers plant sites and rail service the equal of any in the highly-desirable, lucrative metropolitan New York-New Jersey area. Already located in these four areas alone are such substantial concerns as General Motors Corp., Foster Wheeler Corp., Wayne Steel Co., Allied Chemical & Dye Corp., International Cellucotton Co., Hudson Pulp & Paper Co. Negotiations are actively under way for the acquisition by other nationally-known firms of millions of more square feet of warehouse and manufacturing space in these same areas. Anywhere on the Jersey Central, your neighbors are the best. For full details as to how to join them, write or call

Ross E. Rowland, Industrial Agent
Jersey Central Lines
143 Liberty Street
New York 6, N. Y **BArclay 7-9700**

JERSEY CENTRAL LINES

65 CONNECTIONS TO ALL POINTS IN U. S., CANADA AND MEXICO

Picture courtesy of N.Y.N.H. & H.R.R.Co.

BIRD SELF-SEALING TIE PAD AFTER 5 YEARS SERVICE is removed for inspection. Pad had to be pried from tie owing to tenacious seal that is characteristic of all Bird Tie Pads. Reapplied, and becoming resealed after inspection, the Bird Tie Pad is good for many additional years of protective service.

Slash your tie costs 50% with BIRD Self-Sealing TIE PADS

FACTS YOU SHOULD KNOW ABOUT BIRD TIE PADS

It is common knowledge that moisture and abrasive materials destroy the supporting power of the wood under the tie plates and the holding power of the spike wood.

The Bird Self-Sealing Tie Pad was specifically developed to combat these destructive agents. *For that reason, it is entirely different in design, construction and function from any other tie pad on the market.*

This difference lies in the ability of the Bird tie pad to maintain dimensional stability. It cannot stretch or compress under passing wheel loads . . . so that it provides a constant, unbroken seal.

The Bird Self-Sealing Tie Pad completely and permanently seals out moisture and abrasives . . . the *causes* of decay under the plates . . . and, in addition to this, it prevents mechanical wear by acting as a buffer between the tie plate and the tie.

As specialists in the scientific preservation of wood for much of our 161 years in business, we are qualified to help you extend the service of your ties in track.

WHERE

- On the joint and shoulder ties of insulated joints.
- On new or older bridge decks.
- On switch timbers.
- Under crossing frogs.
- Through highway grade crossings and station platforms.
- On curves to insure holding track to gauge and surface.
- With smaller tie plates.
- Out-of-face with new or relayer rail.
- On pile cut-offs.

RESULTS

- You get 50% extra life from new ties.
- You get twice the normal remaining life expectancy from old ties that can be adzed to a smooth surface of sound wood.
- You save on gauge, line and surface maintenance costs in addition to savings on tie life.

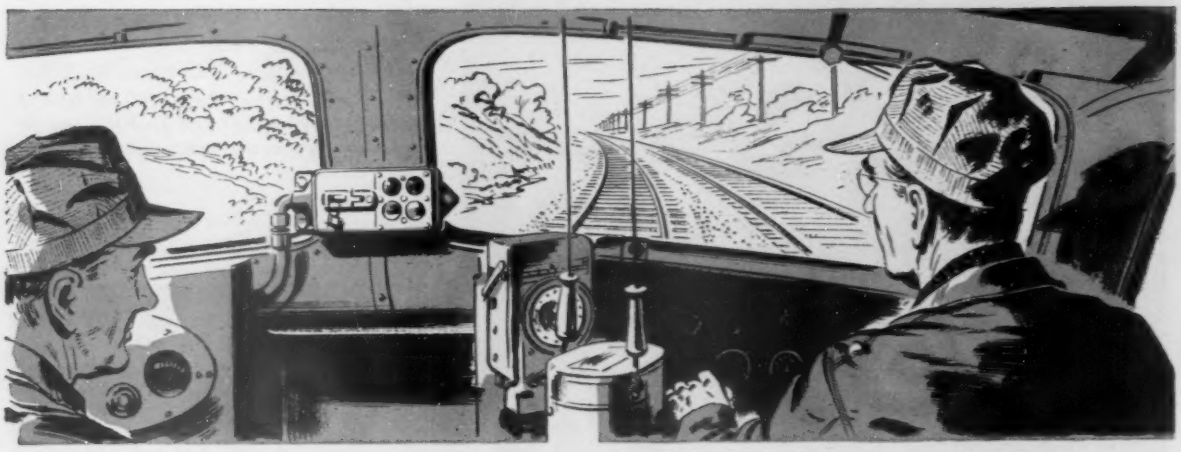
WHEN

You start saving as soon as you start using Bird Self-Sealing Tie Pads. Bird's is the original self-sealing tie pad . . . proven by years of in-track service. Write for further information, today . . . Bird Tie Pads, Dept. HCI-9, East Walpole, Massachusetts.

BUY THE BEST BIRD & SON, inc. Established 1795 **BUY BIRD**

Birthdays

are for looking ahead!



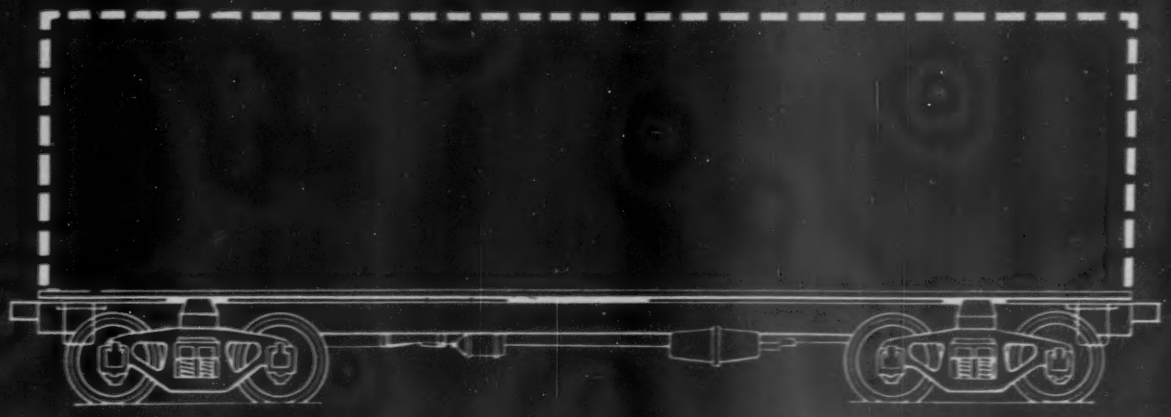
To You, Railway Age, best wishes from one centenarian to another. Making a fresh start from your 100th birthday, you can join with us in working toward the solution of present-day railroad problems. The future holds much promise. We of North Western believe that a vigorous spirit and fresh outlook can create an exhilarating thrust forward to better times. We have made a good beginning: complete dieselization of freight and passenger service, construction of new rolling stock, improved maintenance of way, rehabilitation of existing structures and the building of new. In all of this there is proof that one hundred years is only the beginning . . . the starting point for a robust, successful future.

CHICAGO AND NORTH WESTERN SYSTEM

CHICAGO AND
NORTH WESTERN
RAILWAY SYSTEM

Pioneer Railroad of Chicago and the West-Since 1848

FREIGHT CAR OF THE FUTURE



ROLL-UP SIDES?

SECTIONAL UNITS?

PIGGY-BACK?

CARS IN TRAINS THAT ROLL ON RAIL OR ROAD?

What ever design . . . expect shock-proofing by WAUGH

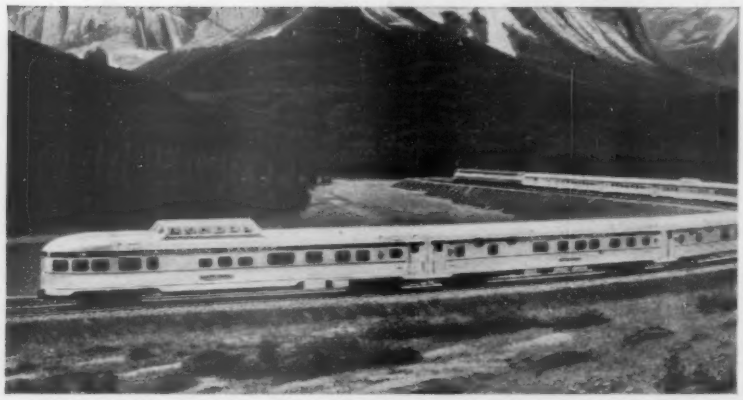
For maximum protection of lading and cars . . . its ⟹ WAUGH Cushion Underframe

WAUGH EQUIPMENT COMPANY, New York · Chicago · St. Louis · Canadian Waugh Equip. Co., Montreal

BY LAND...BY SEA...BY AIR...

CANADIAN PACIFIC

World's most complete travel system



THE CANADIAN...newest milestone in the march of progress...Canadian Pacific operates the only streamlined stainless steel passenger cars in Canada on the world's longest "Dome" route. Canadian Pacific freight and passenger trains serve Canada from sea to sea.

EMPRESS OF BRITAIN...royally launched new 25,500-ton flagship in transatlantic service, April 1956. Streamlined, stabilized, air-conditioned, she heads a fleet of passenger and cargo liners. In 1957, "Empress of England," newest unit of a modern fleet, linking Canada and Europe.

AIR LINERS...modern Super DC-6B's between Canada, Europe, Hawaii, South Pacific, The Orient, Mexico and South America...wings of the world's most complete travel system. Coming in 1957, new "Bristol Britannias," world's largest turbo-prop aircraft.

Canadian Pacific rounds out its world of travel services with the last word in:

HOTELS • COMMUNICATIONS • EXPRESS

By land, by sea, by air, Canadian Pacific provides for Canada's expanding travel needs with modern equipment and new services.

Canadian Pacific

50,000,000 Headfree Joints

sold in the UNITED STATES and CANADA

In our efforts to improve the Rail Joint and cut maintenance costs we developed the Headfree Joint in 1924.

The outstanding performance of this Joint has resulted in its continuous use by most of the railroads in the United States and Canada.

Over 65 Years' Experience in Designing, Manufacturing and Servicing of Rail Joints.

THE RAIL JOINT COMPANY Inc.
50 CHURCH ST. NEW YORK 7, N. Y.

Oldest Copy "Winners"

Less than twelve months separate dates of the oldest and second oldest copies of Railway Age (or predecessor papers) turned up in the Centennial Cash Awards Contest open to holders and finders of the most antique copies of the magazine.

WINNER of the first prize, $100, for an issue of the Railroad Gazette bearing the dateline January 2, 1875:

Robert S. Auten, assistant patent counsel, Law Department, Association of American Railroads, Chicago.

WINNER of the second prize, $50, for an issue of the Railroad Gazette dated December 25, 1875:

Claude A. Hughes, trainmaster, Missouri Pacific, Nevada, Mo.

The first prize winning issue of the Gazette was discovered by Mr. Auten in his office files—a regional branch of the main patent division of the AAR.

The second oldest copy is the personal property of Mr. Hughes, who was given it by an MP agent some 20 years ago.

Other issues of the Railway Age (or predecessor papers) bearing old datelines, and their owners, are:

Railway Age, January 4, 1877—George T. Bennett, auditor-property accounts, Gulf, Mobile & Ohio, Mobile, Ala. He has all issues from January to June 1877, bound. They were originally subscribed to by G. A. Wetton, auditor, Mobile & Ohio (later absorbed by the GM&O), who, as indicated in a letter in the January 11, 1877, issue of Railway Age, claimed to be one of the first subscribers Railway Age ever had (Railway Age was established in 1876).

Railway Age, April 24, 1884—Sam B. Short, traffic manager, Esso Standard Oil Company, Louisiana Division, Baton Rouge, La. Mr. Short also holds issues produced in the years 1885, 1889 and 1891.

Railway Age, January 1, 1885—F. G. Moody, retired superintendent, car department, Northern Pacific, now residing at Los Gatos, Cal. Mr. Moody is a long time personal subscriber to Railway Age.

Railway Age, January 8, 1885—M. J. Maglich, general car foreman, Minnesota Transfer, St. Paul, Mr. Maglich has other issues of that year.

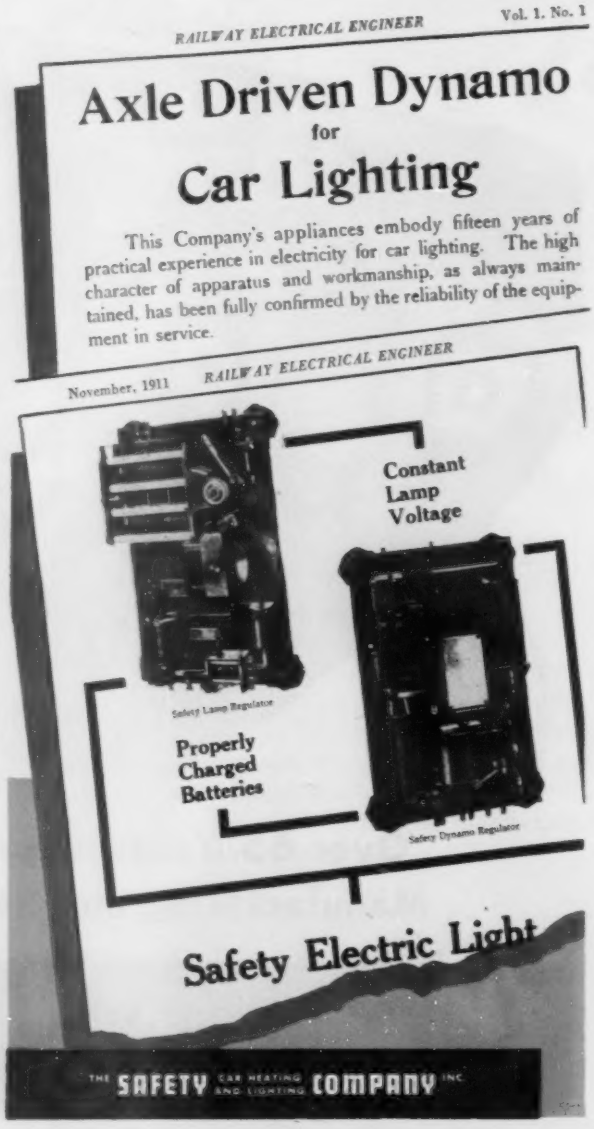
Virtually complete files of Railway Age and its predecessors are available for inspection in a number of libraries throughout the country, including the extremely well stocked and comprehensive library of the Bureau of Railway Economics, AAR, in Washington. Obviously, libraries and archives could not be made eligible to the contest. But Railway Age takes this opportunity to thank these libraries and their staffs for making available to Railway Age subscribers in their reading rooms valuable and interesting periodicals of railroading's past.

THEN

President Taft was finishing out his term in the White House... Hollywood was unheard of . . . radio and TV were not in the language . . .

IN 1911 a vigorous young nation was heading into the greatest industrial growth in history; aided, then as now, by the world's finest system of railroad transportation.

Shown below are Safety Company full page ads that appeared forty-five years ago in the first issues of "Railway Electrical Engineer." Even then, we stressed: **"The high character of apparatus and workmanship, as always maintained, has been fully confirmed by the reliability of the equipment in service."**


RAILWAY ELECTRICAL ENGINEER Vol. 1. No. 1
Axle Driven Dynamo
for
Car Lighting
This Company's appliances embody fifteen years of practical experience in electricity for car lighting. The high character of apparatus and workmanship, as always maintained, has been fully confirmed by the reliability of the equipment in service.
November, 1911 RAILWAY ELECTRICAL ENGINEER
Constant Lamp Voltage
Safety Lamp Regulator
Properly Charged Batteries
Safety Dynamo Regulator
Safety Electric Light
THE SAFETY CAR HEATING AND LIGHTING COMPANY INC.

...AND NOW

"Safety"...

...IN SERVICE TO AMERICAN RAILROADS

"Reliability of the equipment in service . . ."

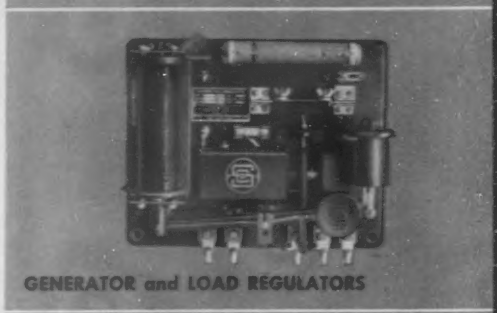
has been the objective of "Safety" design engineers, craftsmen and skilled mechanics since the company was founded in 1887. The temptation of expediency has never altered this aim.

As railroads have grown and improved their equipment, "Safety" products have been developed to meet the exacting, changing needs of modern rail transportation.

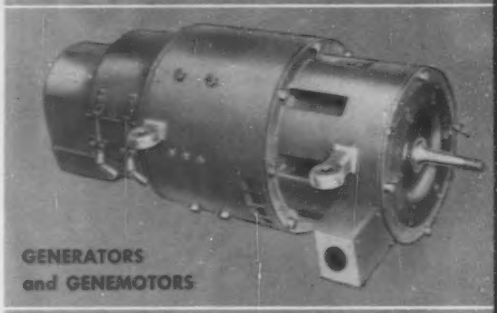
"Safety" Products now include . . .

- Generating and Electrical Control Equipment
- Air Conditioning Units
- Lighting Fixtures

AIR CONDITIONING UNITS

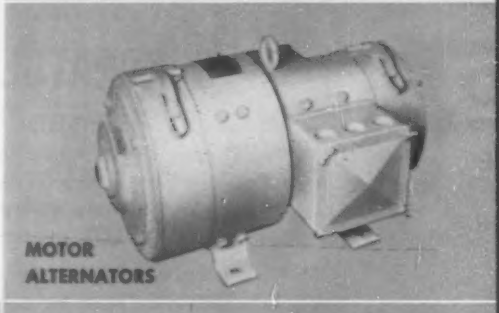


GENERATOR and LOAD REGULATORS



GENERATORS and GENEMOTORS

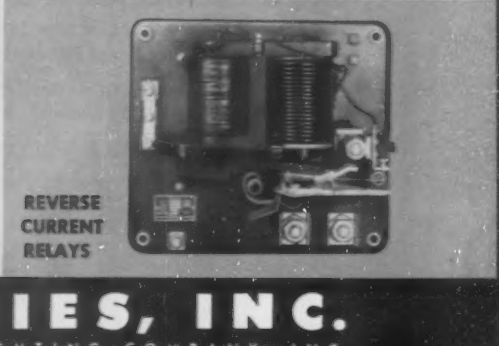
EXHAUST and CEILING FANS



MOTOR ALTERNATORS

LIGHTING FIXTURES

CABOOSE GENERATORS



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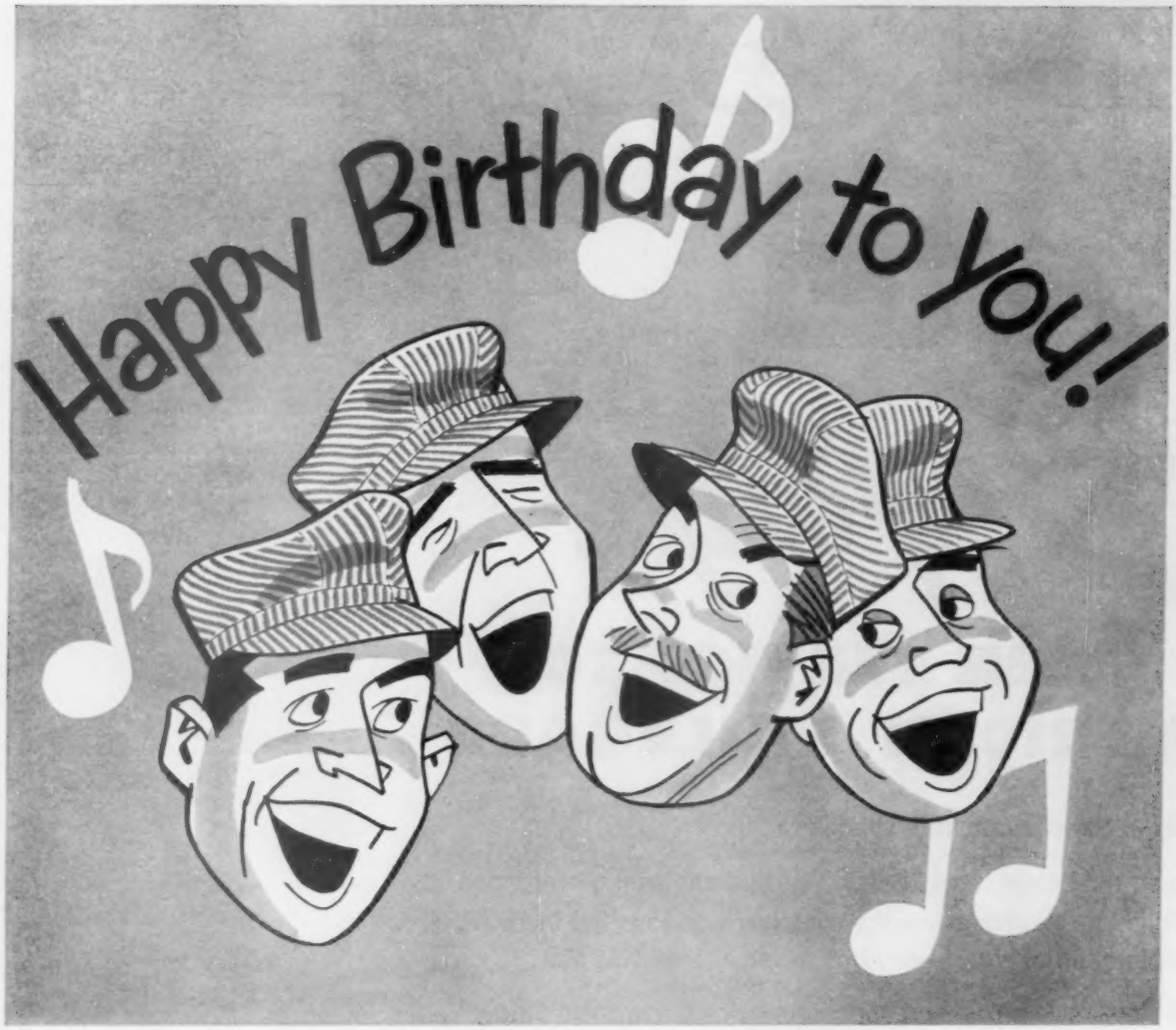

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Industrial ENGINATORS®

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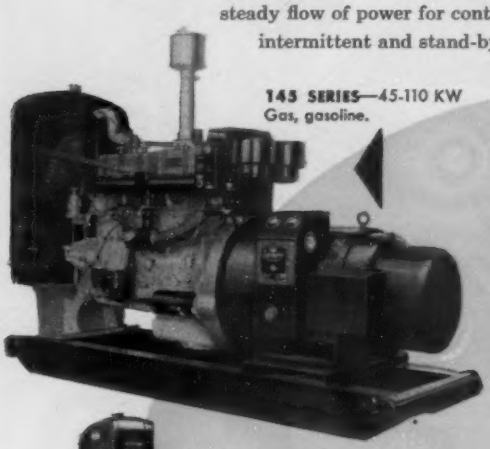
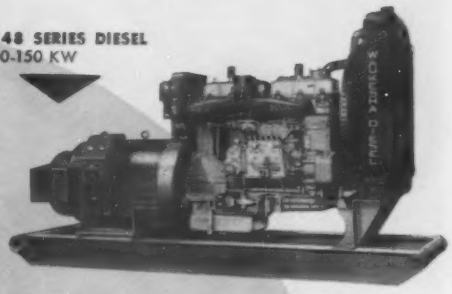
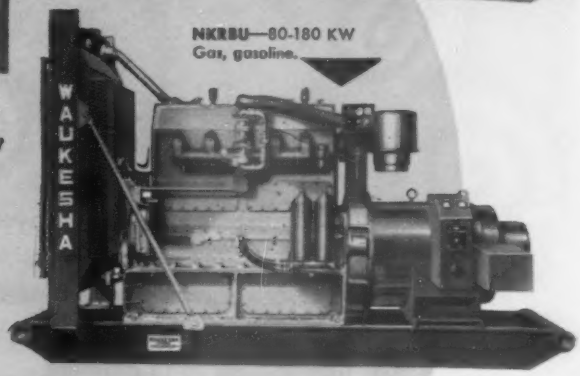
145 SERIES—45-110 KW
Gas, gasoline.



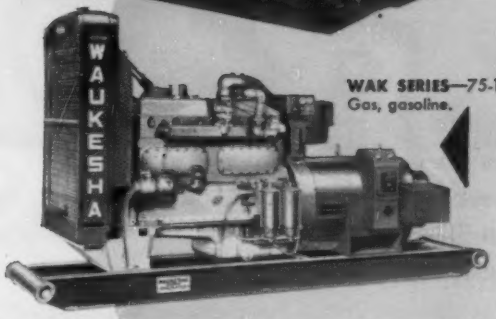
148 SERIES DIESEL
50-150 KW



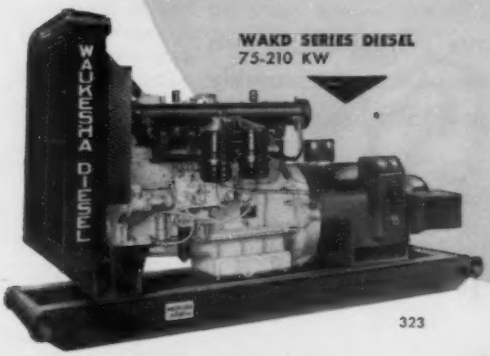
NKRBU—80-180 KW
Gas, gasoline.



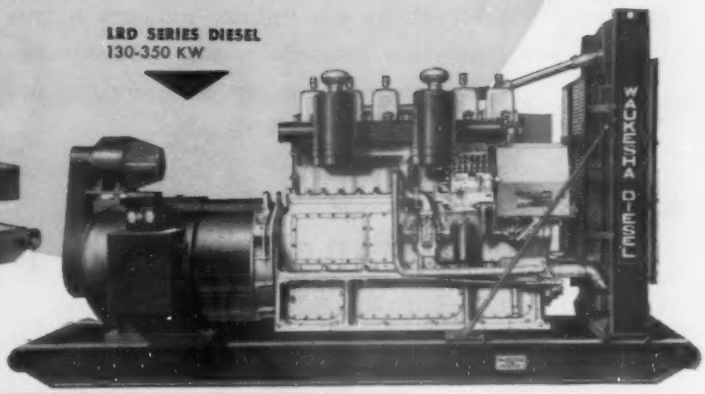
WAK SERIES—75-170 KW
Gas, gasoline.



WAKD SERIES DIESEL
75-210 KW



LRD SERIES DIESEL
130-350 KW



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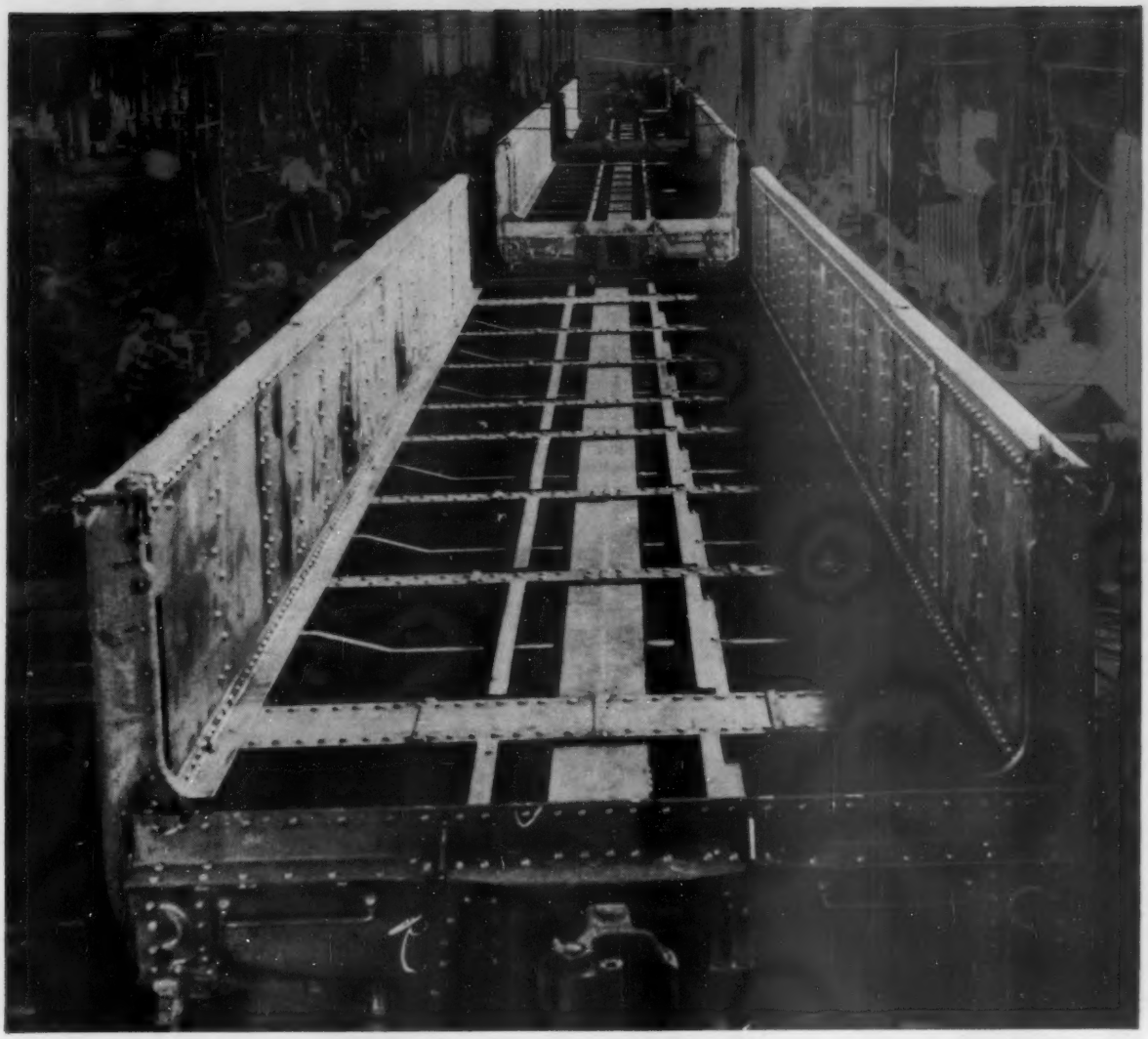
A Salute To Railway Age

on a century of progress!

For 100 years, Railway Age has faithfully recorded the new ideas, experiments and inventions that are now railroad history. This highly readable, week-by-week coverage of railway progress—documented with illustrations and on-the-spot photographs—has offered a constant source of invaluable information to railroaders.

By giving the railway industry a true picture of its own progress over the years, Railway Age has immeasurably *furthered* the business of railroading and thus has advanced the progress of all mankind.

Pennsylvania Railroad

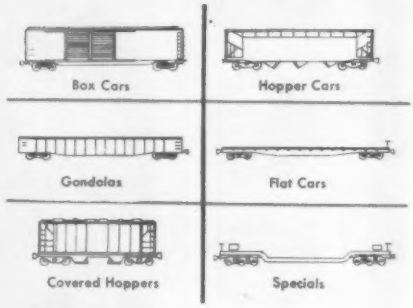


Built for your future ... Freight Cars by Greenville

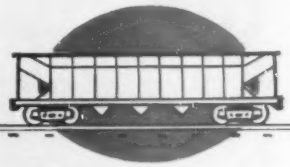
The quality of materials and skillful assembly that go into a Greenville-built freight car today are capitalized in the future years of long wear and service that the car provides.

For more than a generation, Greenville Steel Car Company has been building freight cars for American railroads. During this period, the company has earned a widespread reputation for quality of product and satisfactory performance . . . in terms of service and cost benefits to customers.

In addition to the manufacture of standard cars and cars built to railroads' specifications, Greenville is always pleased to work with the railroads in engineering special cars — or in making alterations to standard equipment to meet specific transportation needs.



Your inquiries will be very welcome and will receive our prompt attention.



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The exclusive SPENO Method of Ballast Cleaning and the SPENO Rail Grinding Train have proved themselves to be time, cost, and maintenance savers for our contractual clients.

You may contract for one or both of these services—secure that you have joined company with many other outstanding and forward looking railroads.

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Color ON THE MOVE!

Using AFI Quick Drying Enamels specially developed for the railroad industry, one railroad paint shop has increased its output from 8 to an average of 35 cars per day!

WELL-PAINTED, well-lettered railroad equipment is a rolling advertising medium—truly "color on the move." With the advent of the diesel engine, American railroads ushered in a period of modernization which includes the widest possible use of color for locomotives and passenger cars, for box cars and gondolas, for covered hopper cars and tankers, for railroad stations, buildings and maintenance equipment. Automotive Finishes, Inc. has developed special synthetic enamels for the railroad industry—test-proven paints with better adhesion, quicker drying, more gloss, harder finish, better color durability, longer wearing finish, lower maintenance cost per car and lower revenue loss in removal from service for painting. Actually, AFI finishes permit cars to be completely refinished and stenciled in a matter of hours. We will be pleased to provide you with full details.

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AUTOMOTIVE FINISHES, INC.

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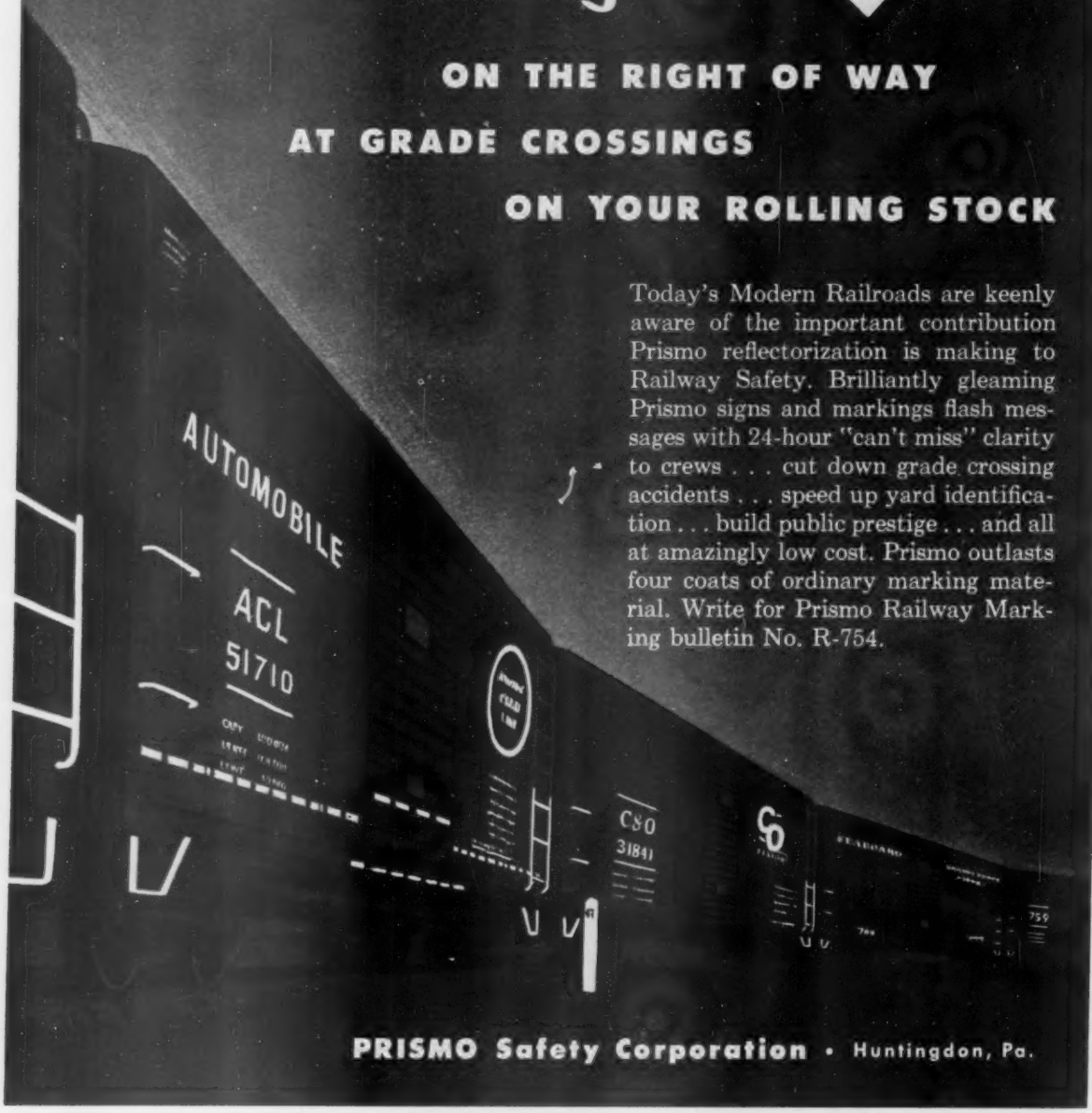
for Safety...

RAIL

ON THE RIGHT OF WAY

AT GRADE CROSSINGS

ON YOUR ROLLING STOCK



Today's Modern Railroads are keenly aware of the important contribution Prismo reflectorization is making to Railway Safety. Brilliantly gleaming Prismo signs and markings flash messages with 24-hour "can't miss" clarity to crews . . . cut down grade crossing accidents . . . speed up yard identification . . . build public prestige . . . and all at amazingly low cost. Prismo outlasts four coats of ordinary marking material. Write for Prismo Railway Marking bulletin No. R-754.

PRISMO Safety Corporation • Huntingdon, Pa.

LIKELY ISSUES...

(Continued from page 269)

Locomotive Firemen & Enginemen has recently decided to seek affiliation. The Brotherhood of Railroad Trainmen has been actively discussing the possibility of affiliation. But the Brotherhood of Locomotive Engineers and the Order of Railway Conductors & Brakemen have shown little interest in joining the newly merged giant labor body.

Some analysts have stated that the prospects of affiliation of the independent railroad brotherhoods are slight because of the costs involved, in the form of per capita payments, and the issue of discrimination. It seems unlikely, in the opinion of the writer, that these two factors would be serious obstacles. The problem is more complex.

The Switchmen's union, under its AFL-CIO charter of affiliation, has the exclusive right to organize and represent the single craft of "switchmen." How will this jurisdictional claim conflict, should the BRT seek affiliation with the AFL-CIO?

Again, let us assume that the Firemen affiliate with the AFL-CIO. It is reasonable to expect that their charter would give them the exclusive right to organize the two crafts of firemen and engineers. Would this close the doors forever to the Engineers? What if the BRT does affiliate with the AFL-CIO? Would this also act as a bar to affiliation by the Conductors?

These questions are raised to indicate that the prospects of affiliation by the presently independent operating brotherhoods with the AFL-CIO are cloudy.

It is evident that the extent to which the operating brotherhoods affiliate with the AFL-CIO depends on their ability to merge their basic differences. Recent history indicates that the conflicts among these organizations are as sharp today as they have been in the past.

This, of course, does not mean that these conflicts cannot be resolved nor that affiliation with the AFL-CIO is necessarily unlikely.

The history of the merger attempts of the AFL and the CIO themselves indicates how the forces of changing personalities, new political situa-

(Continued on page 345)

Sperry

REFLECTOSCOPE TEST BULLETIN

Sperry

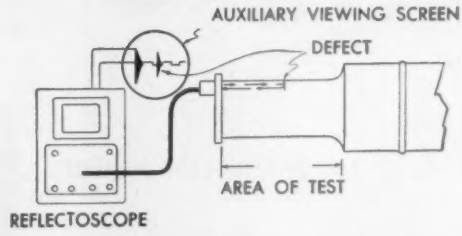
ULTRASONIC INSPECTION with journal test car cuts costs ~ speeds up testing

As many as 320 journals can now be tested daily. The operator drives easily and rapidly beside the track from one journal box to the next. Reflectoscope search unit is placed on journal's end.

Fleet of Sperry Ultrasonic Journal Test Cars proves to be an efficient inspection technique that saves time and money for the C&O. Positive testing is accomplished without the problems and expense of removing the axle from the car. Freight car journals are checked while cars are in the yard or undergoing repairs.

Early detection and removal of faulty axles like this can save hundreds of thousands of dollars in time, labor and expense.

How it Works



The sketch above shows how the Reflectoscope sends a beam of sound energy into the axle and how a crack reflects a portion of this energy back to the search unit. A complete picture of this is shown to the operator on a cathode ray tube mounted directly in front of the driver's seat.

MECHANICAL DEPARTMENTS find that Sperry Rail Service offers the most advanced nondestructive inspection equipment yet developed for practical railroad applications. For complete information return the attached coupon.

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Send details of ultrasonic inspection for railroad equipment.

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RA9

D Tournapull...the "Railroad Handyman"

One man and a "go-anywhere", rubber-tired, 138 hp D Tournapull-Scraper can handle most of your dirtmoving on maintenance and construction projects... at a worthwhile saving in time, money, and manpower.

"D" drives anywhere under its own power via track, right-of-way, or public highway... without damage to track, right-of-way, roads, or unit's tires. 29.5 mph rig often handles several jobs over 50-mile radius in a single day. Big 7½-yard capacity scraper moves large quantities of earth, gravel and ballast quickly... without interruption to traffic or work.

Handyman "D" self-loads, hauls, spreads material... can also be push-loaded. It cleans ditches, builds up shoulders and embankments, slopes banks, fills washouts, spreads ballast, grades right-of-way. On construction work, Tournapull makes cuts and fills, finishes to grade, digs ditches, hauls and spreads ballast. With bulldozer blade, rig aids pioneering, handles miscellaneous dozing, and backfills.

Interchangeable optional trail-units give added utility as rear-dump, lift-and-carry crane, flat-bed hauler. V-type snowplow busts drifts, clears sidings, opens roads, yards, parking areas.

138 hp D Tournapull-Scraper on the Atchison, Topeka, and Santa Fe Railway spreads fill to restore and reinforce embankment near Willard, N.M.

In the decade ahead...You'll save time, cut costs, with more off-track machines on rubber

Times change. Railroad problems change too. Increased earnings go to roads that anticipate and modify methods, to meet today's and tomorrow's needs.

You have successfully met the challenge of the 40-hour week — by increase in mechanization. Today manpower shortages and high labor costs challenge you with similar new problems in your maintenance-of-way and switching operations. Both problems may be solved to a great extent through increased use of fast, efficient off-track machines mounted on big, low-pressure rubber tires.

As you equip to further reduce costs and improve maintenance...to save time and dollars on grading for new sidings and service trackage...and to speed up switching service in congested yards and on remote sidings...be sure to carefully study the line of rubber-tired machines offered by LeTourneau-Westinghouse, a subsidiary of Westinghouse Air Brake Company. Write for complete facts and figures on the cost-cutting machines illustrated here. Ask us to show you how off-track mobility, high work and travel speeds, and a big capacity for hard work can solve many of your problems of today and tomorrow.

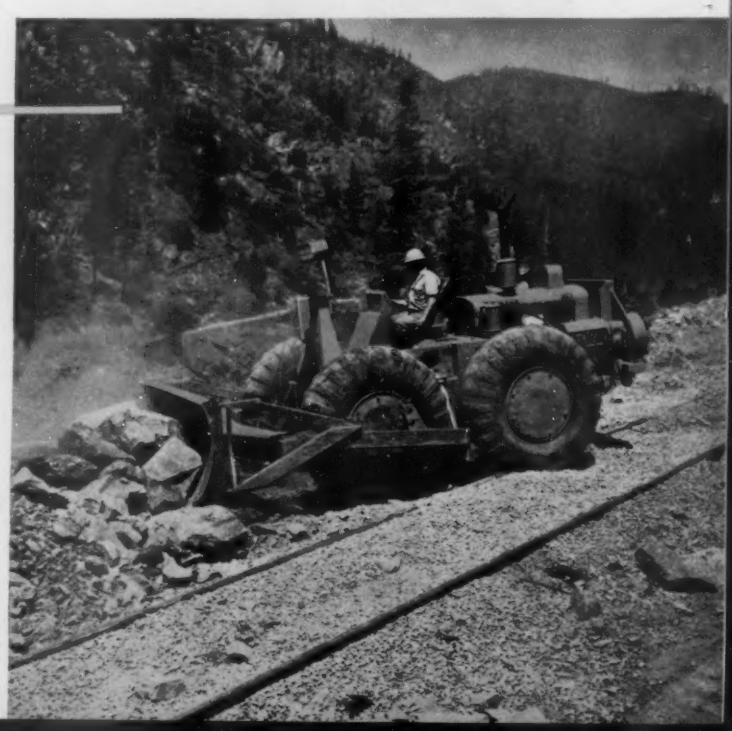
Tournatractor... 208 hp work-and-run tractor

Speed construction work and scattered earthmoving jobs with this high-speed rubber-tired Tournatractor. No need to wait for work-train and a clear track. Operator just hops on and goes ...over tracks, pavement, bridges, right-of-way, or highways... at 17 mph.

On the job, Tournatractor goes right to work without delay to rail traffic. Dozer blade carries 2½ yds. in average material. Tractor push-loads scrapers, casts, backfills, clears landslides, cleans up yards and stockpile areas, plows snow. Tournatractor also pulls equipment speedily, uproots trees, brush, cuts slopes, etc. Because of Tournatractor's greater speeds, it will out-work crawler-tractors of comparable horsepower on most assignments. Its 17 mph roadability makes it an ideal machine for RR work.

Tournatractor has 4-wheel drive, instant gear-change with constant-mesh transmission, torque converter, powerful 4-wheel disc-type air brakes, and fast, finger-tip electric control of blade and power-control-unit. List price FOB is approximately 10% less than crawler-tractors with similar engine horsepower.

Tournatractor dozes blasted rock over bank in scaling operation along mountainous route of Western Pacific Railroad.



SwitchMobile . . . off-rail switcher on rubber

Here's an off-track, diesel switch-engine that speeds-up movement of cars in busy freight yards. It works alone or as an auxiliary . . . handles spotting and moving of odd-lot cars.

SwitchMobile works and travels on rubber tires, is not tied to rails. When needed on another track, it travels direct. No need to clear tracks or to shuttle back and forth through yards. Switcher crosses tracks . . . takes shortest route to next assignment . . . speeds to distant jobs at 16 mph. via track, right-of-way, or highway. SwitchMobile's big, low-pressure tires move onto ties . . . won't damage tracks, yards, switches . . . won't chamfer ties. Unit straddles rails . . . has 6'10" width between tires.

This 18-ton, 4-wheel drive switch-engine easily starts 1250 tons of standing rolling-stock . . . has full range of power and speed, forward or reverse. Its 208 hp diesel engine, through constant-mesh transmission and torque converter, produces 36,000 pounds of rimpull at wheels. Big, low-pressure tires grip ties and ballast . . . provide more tractive effort than steel-wheel switchers twice its weight.

Built to ICC safety standards, unit has regulation railroad controls, "dead-man" safety device, 360° visibility, seat and controls facing either front or rear. It is equipped with regulation standard AAR Type E couplers and air-brake lines front and rear, has standard RR fittings.

Pennsylvania Railroad uses 208 hp SwitchMobile to move cars between yard and customer's sidings. Rubber-tired switcher maneuvers easily over spur tracks laid in city streets.

Adams Graders...save time, hand-work, money

Many maintenance and construction jobs formerly handled by hand-labor, shovel, or dragline crews, can be economically performed by one man and a modern Adams grader. There's no waiting for work-train . . . grader drives via highway or right-of-way, at up to 26 mph.

An Adams helps avoid maintenance "headaches" . . . fixes troubles while they are small. Working alone, it cuts and cleans ditches, slopes banks, widens shoulders, spreads ballast, grades access roads, roots-out brush and weed growth, cleans up around stockpiles.

On construction work, an Adams steps-up production . . . pushes scrapers, cuts rough and finish grades, shapes shoulders and embankments, slopes cut-sides, spreads fill, maintains haul roads, digs ditches, backfills.

Adams graders have a wider range of operating speeds than any other line of graders. This gets more work done, provides greater grading accuracy. Heavy-duty models, 80, 104, 123, 150 hp have 8 forward speeds to 26 mph, 4 reverse to 13 mph, 3 optional creeper speeds. Utility grader, 60 hp, has 18.3 mph top speed, 5 forward, 1 reverse, 4 optional creeper speeds.

Optional equipment available: scarifier, Elegrader, bulldozer, snowplow and wing, rotary snowplow and Snow-blo. Write for details, and a demonstration.

Adams grader spreads fill, widens shoulders, shapes for effective drainage along right-of-way of major U.S. railroad.

SwitchMobile, Adams—Trademark; Tournapull, Tournatractor—Trademark Reg. U.S. Pat. Off. G-1190-RR

LeTourneau-WESTINGHOUSE Company

Railroad Sales Division; Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

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RPI MEMBER

For Every Tankcar Loading or Unloading Situation A NECO SAFETY PLATFORM

OUTSIDE

Handling vinyl acetate monomer at Air Reduction Chemical Company, Calvert City, Kentucky. This NECO 2A platform can be turned manually — has retractable deck and stainless steel piping, automatic foot brake and explosion proof lighting fixtures.

INSIDE

Unloading liquified paraffin at Kalamazoo Vegetable Parchment Company, Kalamazoo, Michigan. This NECO 3NT platform can be raised or lowered hydraulically—fits narrow clearance conditions.

ALL AROUND

Unloading diesel fuel at Chesapeake and Ohio Railway, Detroit, Mich. Shows orderly arrangement of several NECO 2A Safety Tankcar Platforms.

For greater safety, higher morale and more efficient loading and unloading of any type of liquids — let the Nichols Safety Tankcar Platform serve your company. Get full details today.

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International Creosoting and Construction Co.
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5IC6
The International Dating Brand

INTERNATIONAL TIES

LIKELY ISSUES...

(Continued from page 341)

tions, revisions of union ideologies and objectives, and general economic conditions contributed to the eventual merger of two hostile groups. The operating unions cannot be immune to these forces indefinitely and these very forces may well accomplish what men cannot.

If, and when, affiliation of the operating unions takes place, and given the current affiliation with the AFL-CIO of the non-operating group, it is quite likely that the development of "social unionism" may permeate the railroad labor unions. This trend is described by one writer as the "concern of the labor movement not only with the job problems of the organized but with the broader social and economic matters as well."

A second question with respect to the future of railroad labor relations is the entire area of collective bargaining.

This great area can be broken down into three parts: wages, working rules, and grievances.

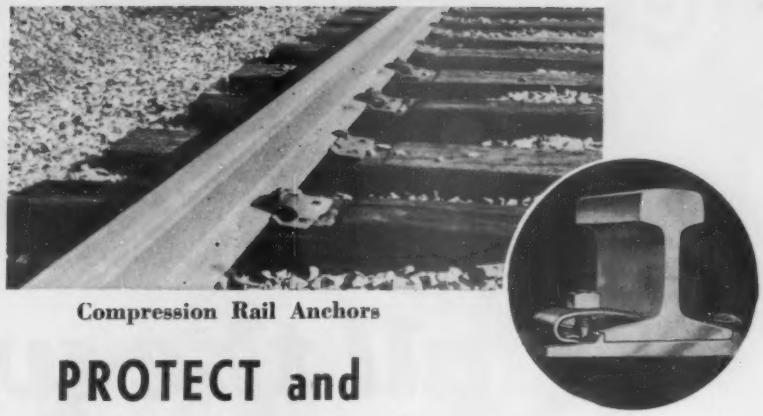
Wage Question

It is safe to assert that wage changes in the railroad industry in the past have been dictated by the economic environment of the industry and the intervention of the federal government. Is there any reason to think that these two factors will not operate in the future? Certain stubborn economic and political facts must be recognized.

One of the major complaints of the railroad industry has been that its ability to improve itself financially has been hampered by an outmoded philosophy of regulation. If certain of the recommendations of the President's Advisory Committee on Transport Policy & Organization were to be put into effect, the railroads' ability to compete would improve. A better financial condition would surely ease any conflict between the parties with respect to wage changes.

The increasing mechanization of the railroad industry, accompanied by the steady decline in employment, is a stubborn economic fact which is bound to have serious repercussions and will undoubtedly influence the

(Continued on page 350)



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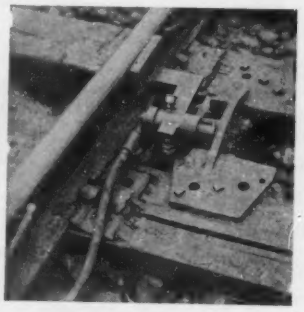
PROTECT and MAINTAIN track with Rails Company Products

Automatic Switch Point Lock

A safety device of rugged construction, simple in design. It is a self-contained unit, automatic in closing and locking operation.

Compression Rail Anchors fit all rail sections; provide efficient, dependable protection against creeping in *either* direction on main track, turnouts, bridges, crossings and welded rail. They accurately maintain expansion gaps, assure even tie spacing and maintain gage. First cost is low and maintenance is reduced to a minimum.



Type G-1 Rail Lubricator

For efficient, low-cost graphite grease lubrication at curves, switches, frogs and crossings. Can be applied on straight or curved rail. Does not require wearing strip or distribution bar.

Rail-Tel Switch Heater

Furnished for propane, natural or city gas for all size switches and derails and is designed to insure proper combustion at a uniformly low consumption rate.

The RAILS Company

RAILS-CO Hoboken · Chicago · St. Louis

Santa Fe
all the way

Si, Si, Chico! Those Santa Fe trains crossing your land are going all the way from Chicago to California. But that's not all. Santa Fe goes all the way from Chicago to Texas and covers 13,147 miles in the west and southwest.

To make trips more pleasant, to make freight shipping easier, travelers and shippers depend on one railroad to serve them *best.* Santa Fe all the way!

Santa Fe

STRENGTH—WHERE STRENGTH IS NEEDED

The floors of today's freight cars take a terrific pounding—from loads and loading equipment as well as from hammers and nails. That's why it is important to specify the modern flooring —N-S-F*—that adds structural strength to critical points in the underframe, can outwear the car itself. And N-S-F has a special antiskid surface that's safer for personnel. In fact, this flooring is so strong, smooth and safe—and provides such good blocking—that shippers everywhere recognize progressive railroading when they see N-S-F in freight cars.

*N-S-F (T.M.): NAILABLE STEEL FLOORING

Made and sold only by

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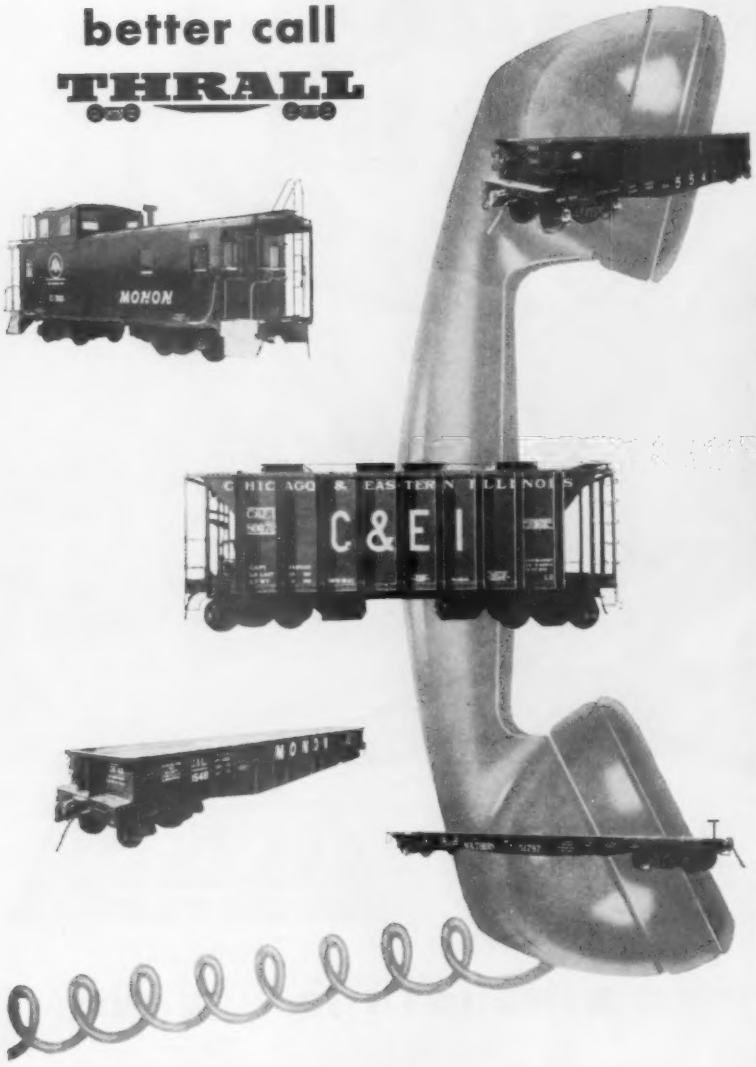
Complete engineering and cost data available from our representatives in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis, Atlanta and Montreal.

56-SS-44A

are you SURE you have the lowest bid?

if not...

better call THRALL



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CAR MANUFACTURING COMPANY
2602 Wallace Street · Chicago Heights, Illinois

If you are planning to buy or lease cars, send for this enlightening brochure. It illustrates many types of cars and tells why:

"Thrall Custom Quality Costs No More"

use

F.O.-102

the chlorinated
CARBON REMOVER
for Hot Tank Dip

To speed the cleaning operation of DIESEL PARTS put F.O.-102 to work in your maintenance departments. This highly effective cleaner has been thoroughly tested to assure top performance. . . . When used in the prescribed manner it will save hours of hand labor and add to the life of pistons, piston rings, fuel pumps, carburetors and engine assemblies.

F.O.-102

INCORPORATES ALL THE ESSENTIALS SOUGHT IN A CARBON REMOVER

- *High Flash Point*
- *Low Toxicity*
- *Non-corrosive to metal surfaces*
- *May also be used as a cold dip*
- *Meets the requirements of AF-20043A*

For Cold Dip—Use fast acting

F.O.-185

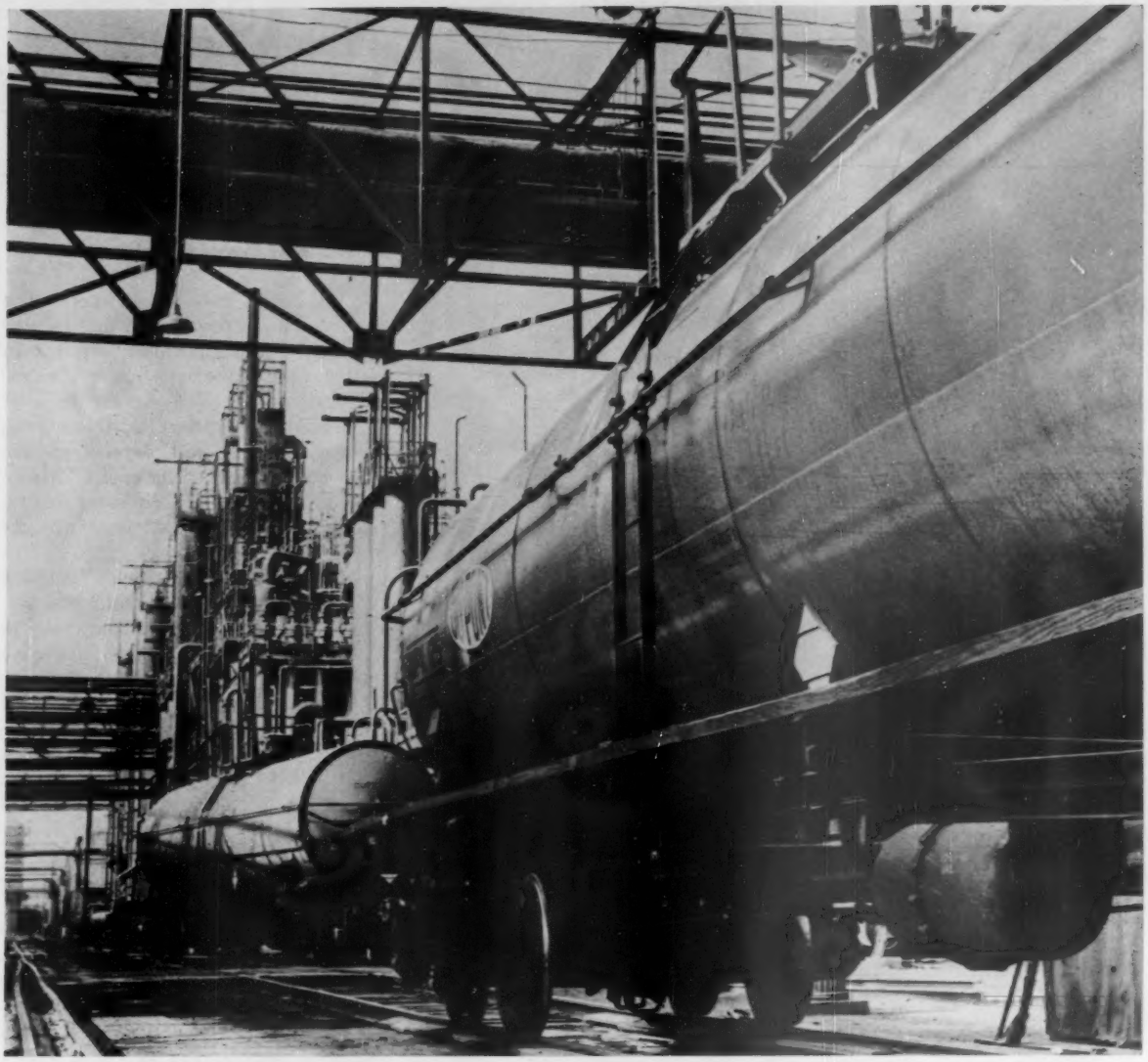
(non-inflammable — low toxicity)

TRY FINE ORGANICS' other well known accepted products:

F.O.-128 and F.O.-101—Safe-tee Solvents
F.O.-106 and F.O.-116—Emulsion Cleaners

Our representative will be glad to call upon request. Write to Dept. 3

FINE ORGANICS, Inc.
211 East 19th St. · New York 3, N. Y.



Old Hickory, Tenn., on the TC

Where East meets West...Down South!

Top Connections in all directions—that's what shippers get who ship the "Nashville Route." TC offers the quickest, surest route to and through the heart of the Nashville area—one of the nation's fastest growing industrial regions. Here's where TC is picking up new business almost as fast as it appears. That's because TC has proven that it *has the goods* to deliver the goods, *on-time, anytime, anywhere.*

TENNESSEE CENTRAL Nashville 3, Tenn.

behind every Ohio Crane
a half century of experience
For Example—Research has shown that operator comfort and full vision are prime factors in efficient crane operation. Ohio cabs and air controls are carefully, scientifically designed to "keep the cab man comfortable" and to provide maximum vision.
There are still some chuffing steam cranes doing their daily chores faithfully — Ohio products of 50 odd years ago. While steam has given way to diesel there has been a continuing quality — constantly improved through the years that has brought Ohio crane users back for more.
Whether it's clamshell, magnet, hook, pile driving, or general crane work, there's an Ohio ready and able to serve you well for years.
THERE'S NO SUBSTITUTE FOR EXPERIENCE
100% AIR CONTROLLED
THE OHIO LOCOMOTIVE CRANE COMPANY
A note on your letterhead will bring catalog and other details. Let our engineers help with your material handling problems.

LIKELY ISSUES...

(Continued from page 345)

wage policies of the railroad labor organizations.

Hand of Government

Although government intervention under the procedures of the Railway Labor Act will obviously continue in the future, the question of "extra-legal" intervention—in the form of White House pressures, injunctions, and seizures—will depend on the political future. The recent "hands-off" tendencies of the present Administration can be contrasted with its predecessor.

On balance, a "hands-off" attitude tends to give the unions more bargaining strength and comes closer to a re-establishment of "free" collective bargaining.

If the economic development of the railroad industry lags behind the economic development of the country as a whole, the conflict between the parties, particularly with respect to wages, will become sharper, in my opinion. This conclusion is based on the fact that the railroad workers will insist on sharing the larger national economic pie to the same extent as other groups—even though the railroad "pie" is not larger. In contrast, the carriers will argue in terms of their own economic position. This basic conflict over wages may well be a continuing one, the solution to which might have to be increased governmental intervention.

The future in this problem area is not bright.

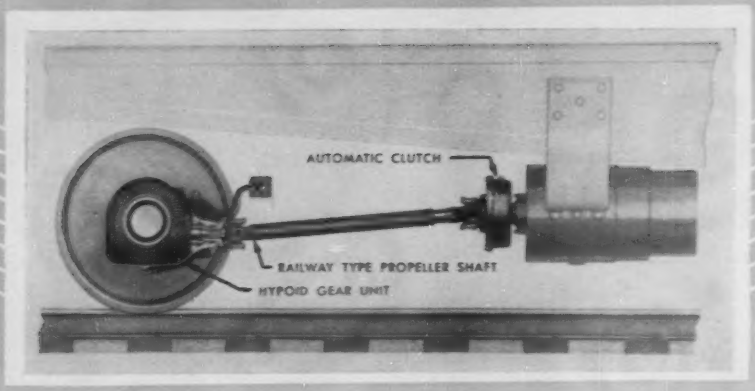
Working Rules

Attempts by the carriers to eliminate or revise working rules will probably increase. Their recent counter-proposals in response to the wage demands of the operating unions indicate that management is seeking elimination or revision of rules in areas which touch the vital spots of the unions.

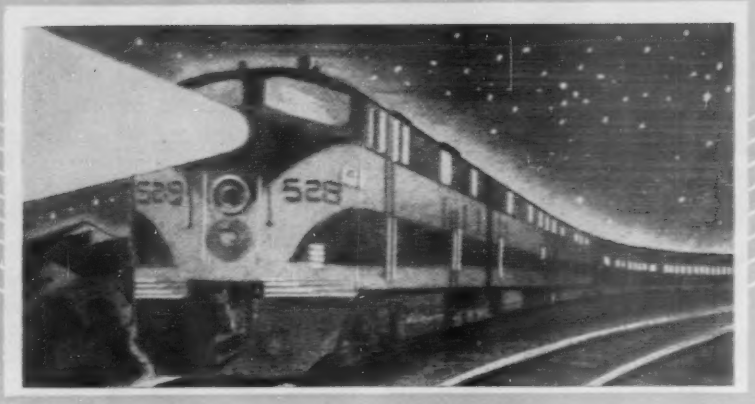
Whether such counter-proposals are made to offset wage demands is not under consideration here. The fact is that the unions are determined to resist changes in working rules which they consider to be of vital

(Continued on page 368)

OVER 12,000



Spicer Railway Generator Drives



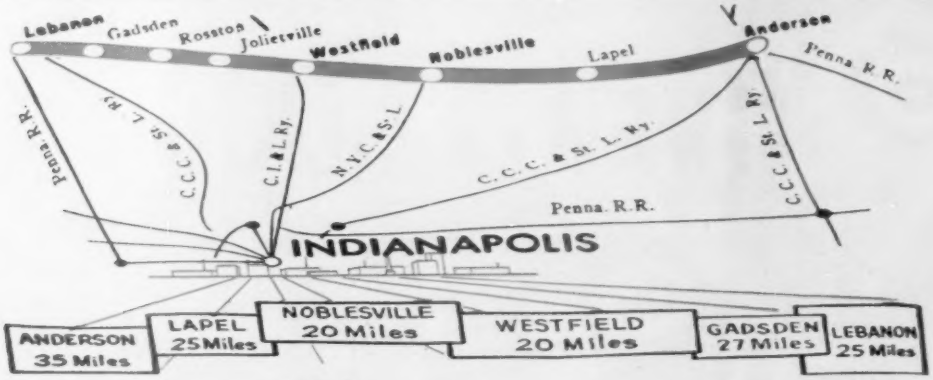
now in use by more than 80 railroads

— a record unequalled by any other similar unit!

DANA CORPORATION
TOLEDO 1, OHIO

Spicer

SPICER PRODUCTS: TRANSMISSIONS • UNIVERSAL JOINTS • PROPELLER SHAFTS • AXLES • TORQUE CONVERTERS • GEAR BOXES • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES • STAMPINGS • SPICER and AUBURN CLUTCHES PARISH FRAMES • SPICER FRAMES



Our business is *picking up* . . . and delivering . . . carload shipments to and from industries and enterprises located along the Central Indiana.

Because the CI is a *short* short line, we can know personally every customer in our territory and understand individual shipping requirements, and because our diesel-powered facilities are small enough to be flexible, we can tailor our services to customer needs. "Outskirting" Indianapolis, with direct connections on four trunk lines to and from that hub, we are in a favorable position for mutually profitable business, and are studying every possibility for developing increased traffic on the CI which will benefit its customers at the same time.

We invite industrial and business interests to consider the excellent advantages of locations in this pleasant Hoosier countryside. Competent labor is available in the communities along the CI, and costs are moderate. Your inquiry will receive my personal attention.

Ike W. Duffey
President

"The Midland Route"

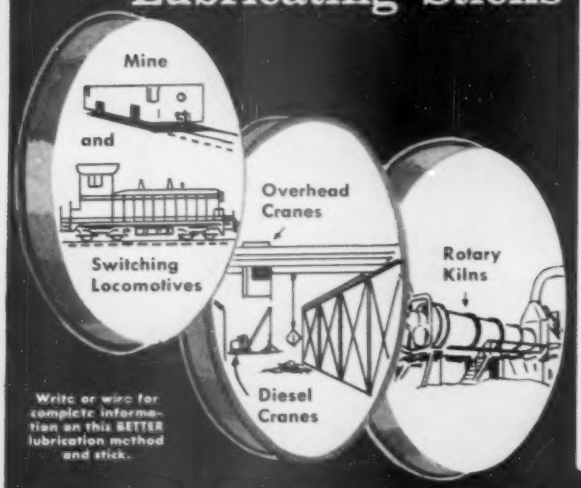
CENTRAL INDIANA RAILWAY COMPANY Anderson, Indiana

On All Rolling Equipment

Lower Maintenance Cost . . . Greater Wheel Life

TRANSALL®

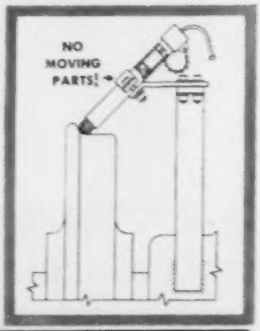
Flange Lubricator* and Lubricating Sticks*



Write or wire for complete information on this BETTER lubrication method and stick.

Effective lubrication where you want it . . . *dry* lubrication that won't creep, cause slippage or pick up abrasive sand or dust . . . *trouble-free* lubrication that increases horsepower hours in service . . . cuts wheel-flange maintenance and downtime costs as much as 50%!!

Transall's *square, dry* lubricating stick, scientifically compounded and service tested over a long period of time for safe, effective lubrication, will not rotate in Transall's adjustable lubricator barrel. You get constant lubrication over the entire wear area. Simply installed and easily maintained, Transall® Flange Lubricator* and Sticks* are your most economical buy for safe, fully effective wheel maintenance.



*Patents Pending

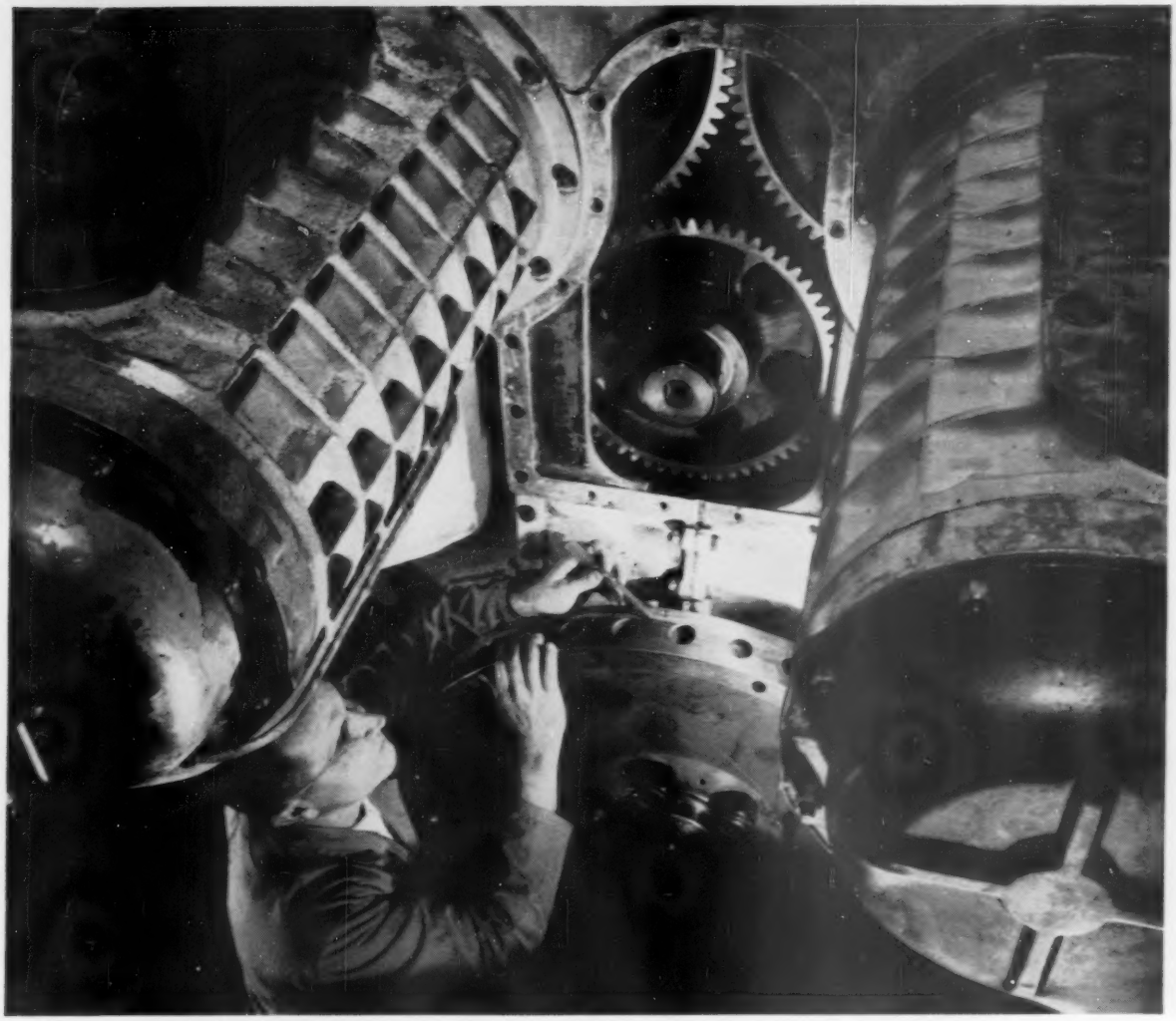
TRANSALL, INC.®

RAILWAY DIVISION • 109 No. 11th Street • P. O. Box 1588 • BIRMINGHAM, ALA.

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL RR

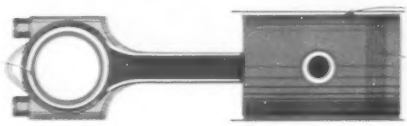
FIRM NORTHERN PACIFIC RAILWAY
South Tacoma, Wash.



RR diesel gears show only ½° wear in 2½ million miles

Timing gears on this Northern Pacific GMC-diesel locomotive engine, lubricated with RPM DELO Oil RR, recently completed 2½ million miles of severe freight service without repairs or adjustment. NP's South Tacoma Shop Foreman, A. R. Genin (above), indicates degree marks on engine flywheel, used to gauge gear wear. Tolerance between gear teeth shows variance of just ½° from original setting. Mr. Genin says, "We consider this low rate of wear remarkable for heavy-duty freight operation. It is typical of our experience during the 12 years we have used RPM DELO Oil in all our locomotive diesels." Engines are 1350 h.p. 16-567 series.

Why RPM DELO Oil RR reduces wear, corrosion



• Oil stays on engine parts—hot or cold, running or idle • Anti-oxidant resists lacquer formation • Detergent keeps parts clean • Special compounds prevent corrosion of bearing metals • Inhibitor resists foaming.

LUBRICATING OILS RPM DELO

For More Information about RPM DELO Oils or other petroleum products of any kind, or the name and address of your nearest distributor, write or call any of the companies listed below.

TRADEMARK "RPM DELO" AND DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20

THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso

THE CALIFORNIA COMPANY, Denver 1, Colorado

An ACF Progress Report—

acf sets the pace for the future of railroad equipment

New device for better railroad trailer service. New ACF Retractable Trailer-Hitch eliminates fixtures on the trailer, supports and holds trailer front end firmly with over twice the impact resistance of other devices. Because it is part of the flat car, it eliminates dead weight on the trailer, retracts to floor of car when not in use. One man with a portable power wrench can secure trailer in 2¾ minutes, compared with other devices which require 3 men, twice as much time.

Adapto can be the freight car of the future. The idea was new—and ACf made it an operating reality, an entirely new freight car with remarkable advantages. Per ton of capacity, the Adapto costs less to buy, less to maintain, less to haul than any other freight car in existence. Its adaptability—it can be changed from box car to gondola, hopper, flat car, or any other in a few minutes—drastically reduces dead-heading, greatly increasing the utilization factor. The Adapto is now being exhaustively tested by leading railroads.

From the first-low-center of gravity lightweight train—"eight years first"—to revolutionary developments now on the drawing boards, ACf sets the pace for railroad equipment progress by transforming ideas into fully-tested operating realities!

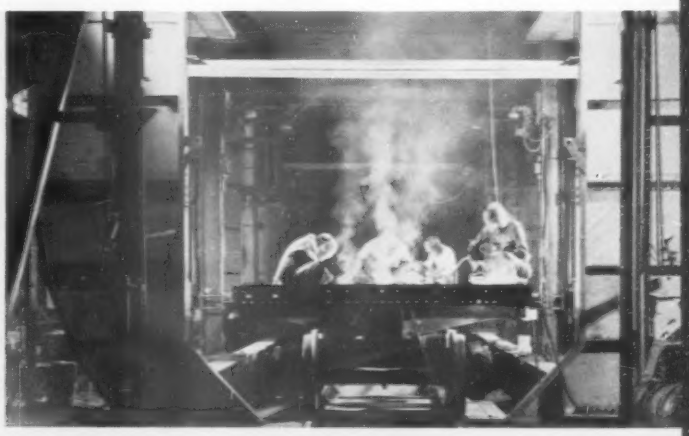
Breaking the ground for the future takes many forms... from constant testing of small components to development of complete prototype trains for freight or passenger service. Constant effort and continuous investment in the basic search for progress has characterized ACf throughout the years.

No wonder railroads look to ACf for *the better way*... equipment that creates constantly advancing standards for lower-cost, higher-revenue service in the world's greatest transportation system. In research, development, and production of modern equipment, ACf is first. When you are thinking ahead, contact an ACf Sales Representative. He will have some interesting developments to discuss.

AMERICAN CAR AND FOUNDRY DIVISION
ACf Industries, Incorporated
30 Church Street, New York 8, N. Y.

Sales Offices: Chicago 4, Ill. · St. Louis 1, Mo. · Cleveland 13, Ohio Philadelphia, Pa. · Washington, D. C. · San Francisco 4, Calif.
Plants: Berwick, Pa. · Milton, Pa. · Huntington, W. Va. · St. Charles, Mo. · St. Louis, Mo.

No limits to the future. Looking ahead with "imagineering", ACf development engineers bring ideas to fruition in passenger as well as freight equipment. This continuing program of product development has produced such equipment as the first modern, truly lightweight train nearly eight years ago—ACf-built *Talgo*—and has improved each of the subsequent Talgo trains in the light of operating experiences. Other developments first or exclusively built by ACf include Dome Diners, Adapto freight cars, Production Design Freight Cars and many other new or improved products. From research come the ideas that make ACf first by years in railway equipment progress.



Constant improvements in manufacturing methods. Welding freight car underframes improves quality, cuts manufacturing costs and produces railroad cars that are kinder to lading. Standardized "Production Design" cars permit the most modern manufacturing methods to be used on a mass-production basis, resulting in outstandingly superior cars at lower cost. Special jigs and automatic welding techniques developed by ACf result in more durable construction and mass production economy. Constant research and testing of production methods and design help set the pace in better railroad equipment in service today and in development for tomorrow.

Thanks

We are young—very young by comparison—as a supplier to the railroads.

When we first considered entering the market we were told it was a cold and practically closed fraternity. Yet the railroad men who have joined our firm, and those we have been associated with since, are among the most warm-hearted and congenial men we have known.

Railroad men, suppliers, even competitors—have been honest, friendly and helpful to a degree that makes us wish we shared a century instead of less than a decade of this heritage.

We write not only to pay tribute to *Railway Age*, which has contributed to the making as well as the recording of 100 years of the progress of that grand ancestry, but to express our sincere thanks to an industry which has treated us so well.

We will try to express our appreciation by living up to your traditions.

INTERNATIONAL STEEL CO.

RAILWAY DIVISION (and *all* divisions)
Evansville 7, Indiana

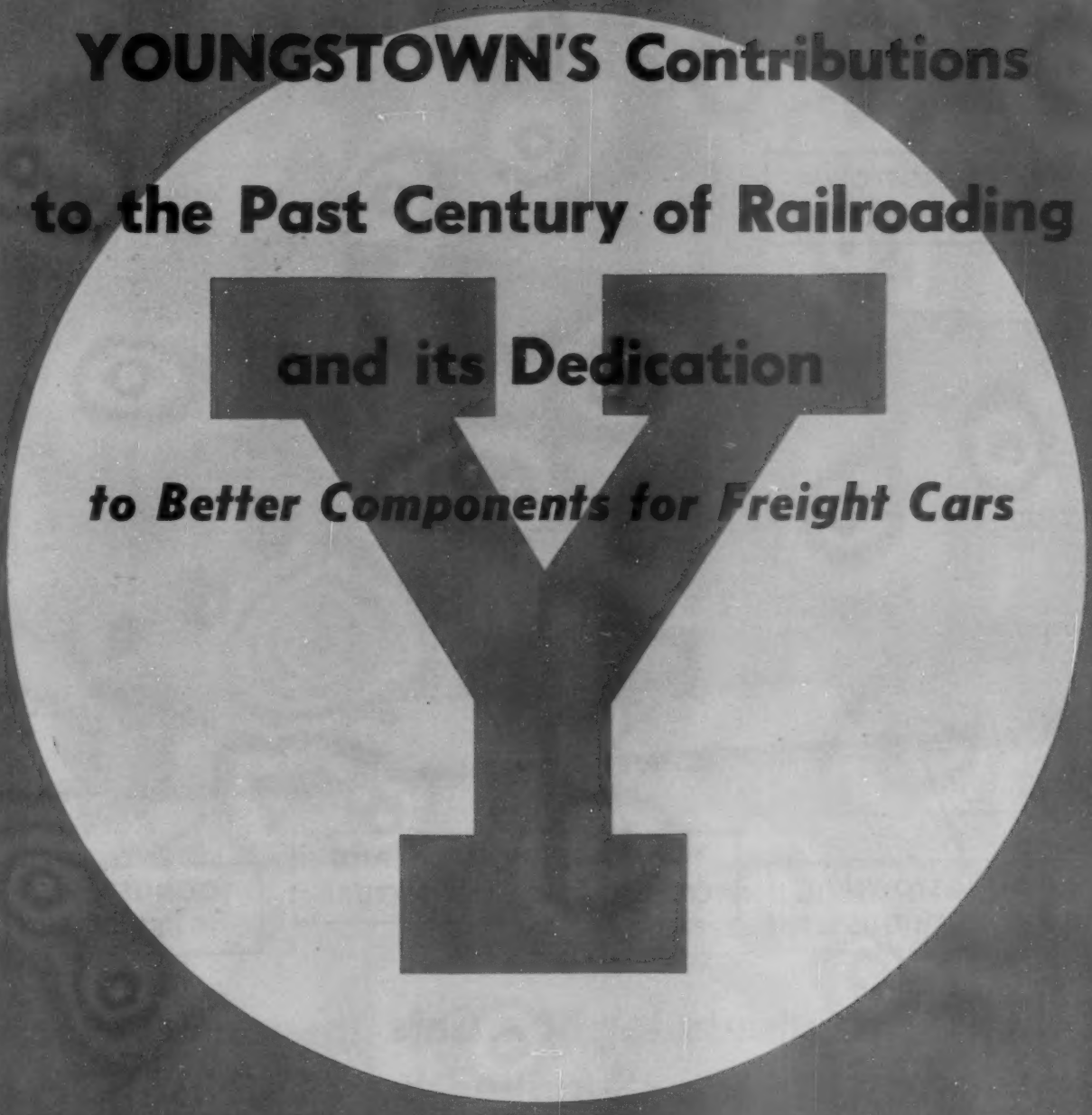
GEARED TO PROGRESS
P R I
MEMBER

YOUNGSTOWN'S Contributions

to the Past Century of Railroading

and its Dedication

to Better Components for Freight Cars

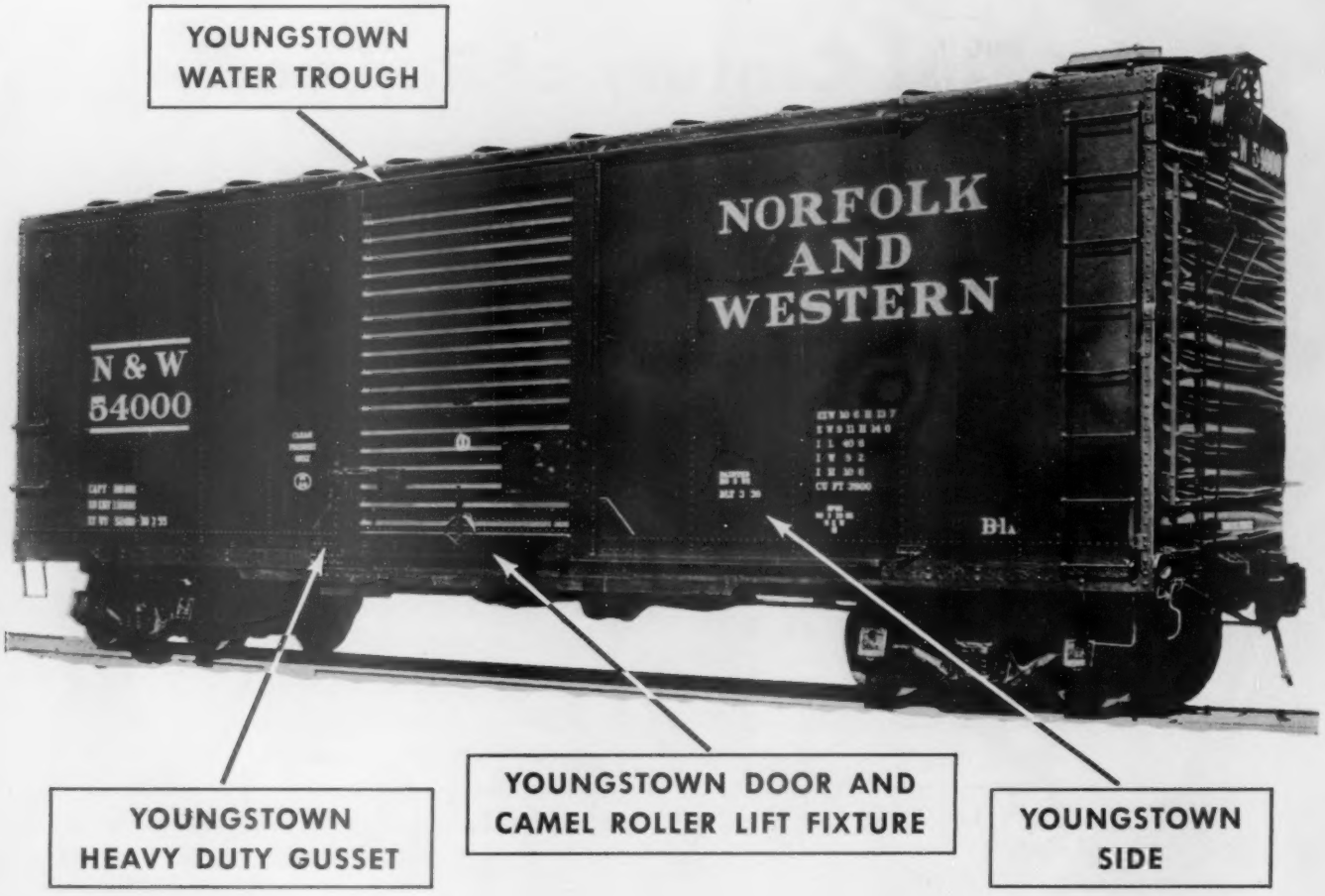


YOUNGSTOWN STEEL DOOR COMPANY

Camel Sales Company
Cleveland Chicago

Camel Company Limited
New York Youngstown

YOUNGSTOWN COMPONENTS FOR BOX CARS



Other Components for Box Cars Supplied by YOUNGSTOWN

INTERLOCKING TOP RETAINING Z-BAR

DOWNSPOUT

CAMEL OPENING, CLOSING AND WEDGE TYPE LOCKING DEVICE

FLEXIBLE REAR EDGE SEALING STRIP

FRONT AND BACK STOPS

CORNER POST

UNDERFRAME EXTENSION CORNER CAP

RIGID REAR EDGE SEALING STRIP

DOOR TRACK

TRACK BRACKETS

TENSION BAND ANCHOR

DOOR HEADER

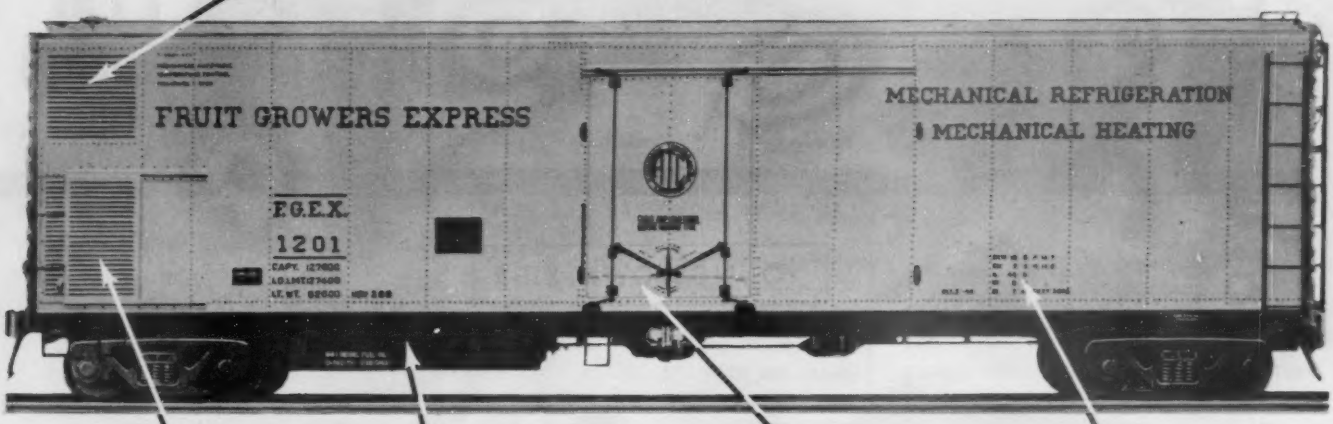
THRESHOLD PLATE

END DOOR FIXTURES

SPARK STRIP

DIAGONAL DOOR POST

YOUNGSTOWN COMPONENTS FOR REFRIGERATOR CARS



YOUNGSTOWN ENGINE COMPARTMENT GRILL

YOUNGSTOWN FUEL TANK

YOUNGSTOWN SIDE

YOUNGSTOWN GRILLED SLIDING DOOR

YOUNGSTOWN SLIDING FLUSH DOOR AND DOOR FIXTURE

Other Components for Refrigerator Cars Supplied by YOUNGSTOWN

LATCH FOR HOLDING DOOR IN OPEN POSITION

ENGINE COMPARTMENT GRILLE A. L. LOWER CORNER

CONDENSER GRILLE A. R. CORNER

FRONT AND BACK STOPS

AUXILIARY DOOR LOCK

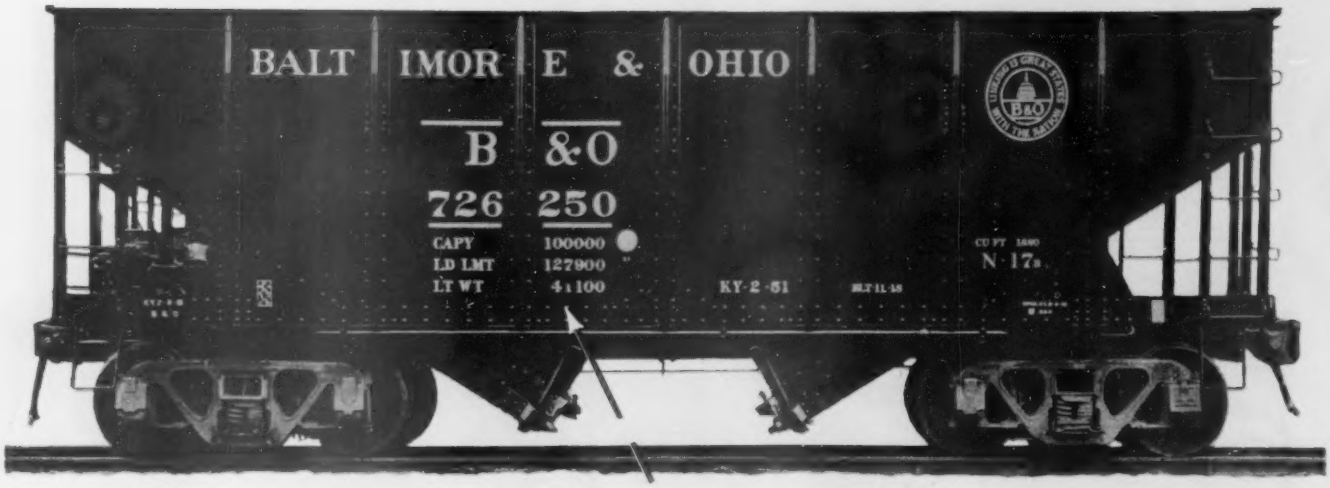
INSPECTION DOOR PANEL

ACCESS DOOR

RUBBER SEALING STRIP

SUMP TANK

OTHER YOUNGSTOWN COMPONENTS



YOUNGSTOWN SIDE

YOUNGSTOWN DROP BOTTOM CONTAINER

YOUNGSTOWN HATCH COVER AND FRAME

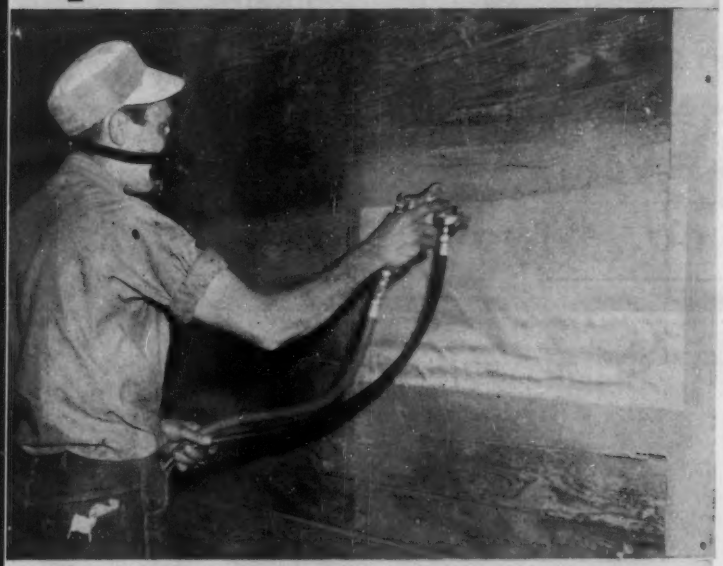
YOUNGSTOWN STEEL DOOR COMPANY

Camel Sales Company
Cleveland Chicago

Camel Company Limited
New York Youngstown

Now *Two* Men Can Upgrade 30 Cars A Day!

1 **Spray, brush or roll ADM Freight-Liner 810 on wood or metal areas to be patched. Freight-Liner plastic is ready-to-use as it comes from the drum. Standard spray equipment can be used. No special surface preparation required.**



2 **Apply Freight-Liner Fiberglass over the area to be patched while first coat of Freight-Liner 810 plastic is still wet. Fiberglass can easily be cut with shears to desired size. ADM Freight-Liner 810 plastic plus reinforcing cloth gives a finished tensile strength of 11,125 pounds per square inch.**

3 **Apply second Freight-Liner 810 coating to impregnate reinforcing fiberglass. Coating air dries rapidly to tough, smooth, abrasion-resistant surface. Seals out dirt and insects. Where large broken areas require added strength, the coatings may be laminated in several layers.**

Pick any two men in your yard crew! With an hour's training, they can upgrade 30 cars a day with the ADM Freight-Liner 810. They just follow three simple steps shown in the unretouched photos at the left.

In a matter of minutes this car was upgraded and ready for a bulk lading. Cost of labor and materials for spot patching was only 15 cents a square foot.

Whether you are patching with Freight-Liner 810 or completely relining cars with Freight-Liner 7115, the ADM Freight-Liner System is fast, low cost and practical.

Apply at any location, in any weather.

In service for over two years, the ADM Freight-Liner System not only upgrades cars faster but reduces both damage claims and per diem charges. Claims for sacks and packaged goods torn in transit are drastically reduced. Leakage of bulk shipments is controlled.

Qualified ADM service engineers provide everything needed to start your yard crew on an upgrading program. For an ADM Freight-Liner System demonstration on your own cars at any track location, write, wire or phone (FEderal 3-2112—Minneapolis) ADM Freight-Liner System, 737 Investors Building, Minneapolis 2, Minnesota.

ADM

Freight Liner

SYSTEM

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Archer QUALITY

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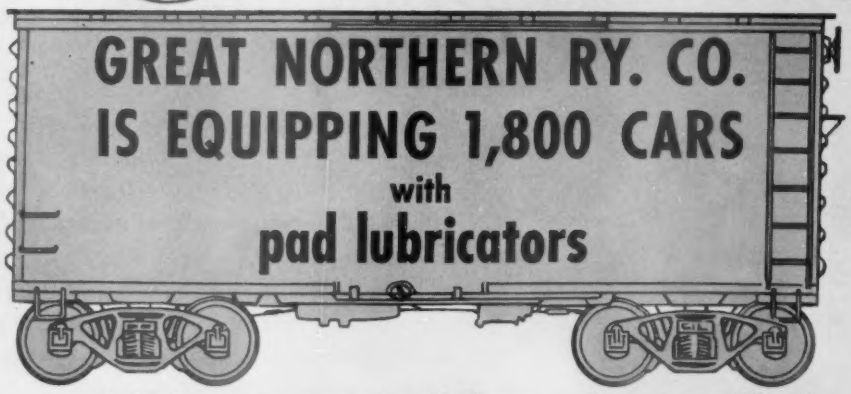
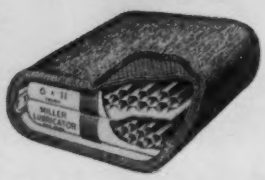
GREAT NORTHERN RAILWAY

For Progressive Railroading



MILLER



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- *Cost—$40 per carset (for all sizes)*
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EASILY PORTABLE INSTRUMENTS FOR DEPENDABLE ELECTRICAL TESTING

Railroad electrical men . . . working on signals, communications, air conditioning, traction motors or generators . . . find many basic advantages in using Megger® instruments and other James G. Biddle electrical testing equipment.

Biddle electrical testing instruments are always portable, designed for ready use out on the line or in the shop. They are direct-reading and easy to use. One man can perform tests—no calculations—no adjustments. They are accurate and dependable over long periods of hard use in all sorts of difficult circumstances. They require a minimum of maintenance.

For many years the railroads have relied on Megger Insulation Testers, Ground Testers and Ohmmeters, because they are good instruments that perform an indispensable service. In recent years, new high range equipment has been added to the Biddle line . . . such as the Biddle Dielectric Test Set for measuring d-c current at voltages up to 40 kv. In the future as in the past the railroads can depend on Biddle for the best in electrical testing equipment.

B624

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Electrical & Scientific Instruments

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- ☐ 21-85-RA—Midget Megger Insulation Tester
- ☐ 21-60-RA—Bridge-Meg Insulation and Resistance Tester
- ☐ 24-25-RA—Ducter Low Resistance Ohmmeter
- ☐ 21-95-RA—Midget Megger Circuit Testing Ohmmeter
- ☐ 25-RA—Megger Ground Testing Instruments
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COMPANY

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CITY

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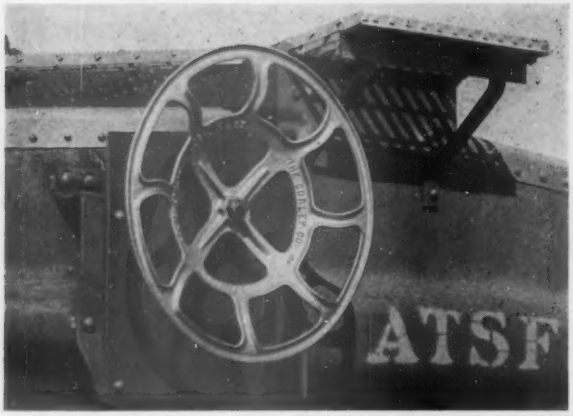

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Geared Hand Brake Wheel for Replacement

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DEPENDABLE

NP ***DOOR CONTROL***

"for the full life of your vehicle"

NATIONAL PNEUMATIC CO., INC.
Boston 19, Massachusetts

KEEP

BUYING

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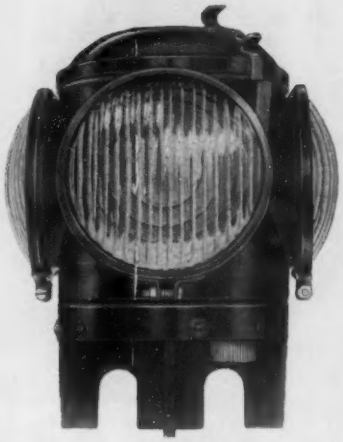

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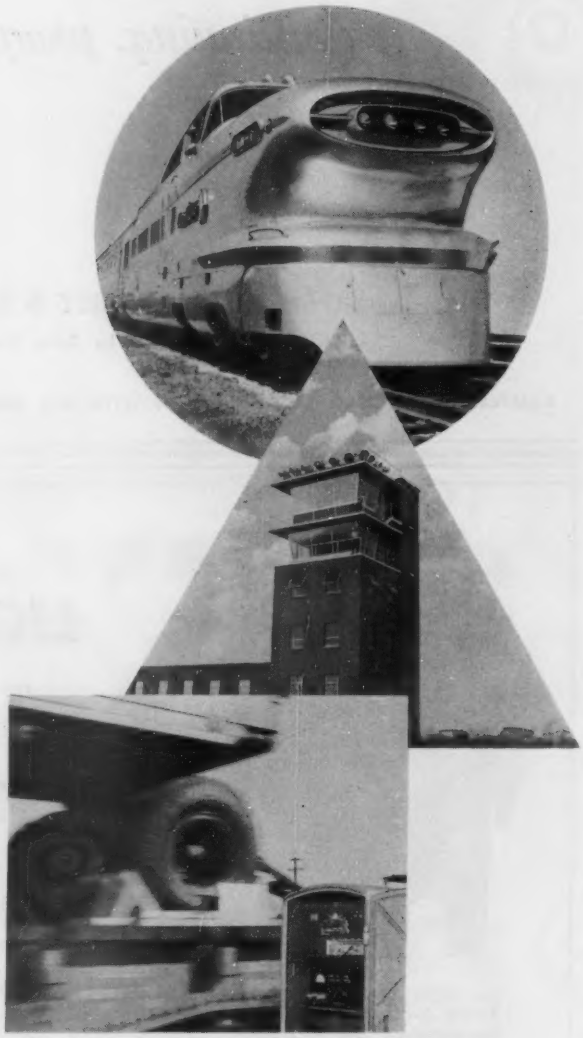

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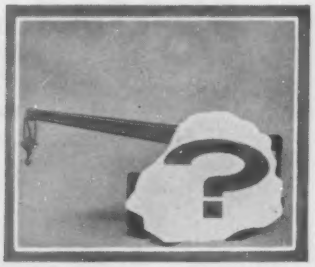

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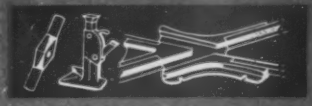

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LIKELY ISSUES...

(Continued from page 350)

importance to their membership. It is in this area that another serious conflict will develop. The solution will depend on a large extent upon the willingness of the parties to understand and resolve their mutual problems.

In the area of grievances one finds on the railroads a situation unique in industry. Whether or not the large number of grievance cases—particularly in the operating end of the business—is justified, it is evident that they are a serious problem. The semi-militaristic form of organization (essential, perhaps, from the nature of the industry), the difficulty of proper supervision—particularly among operating employees—and lack of adequate supervisory training contribute to the problem.

The first two factors are probably uncontrollable; the third can be dealt with by the railroads. It is essential that railroads expand their training program so their supervisors will have a better understanding of the problems and needs of the employees.

The solution here does not lie in the direction of more lectures in which supervisors are "told" to do the "right" things. What is required is a careful, systematic method of instruction, incorporating the latest contributions in the field of personnel relations.

Conclusion

This prognosis of the future of collective bargaining in the railroad industry would seem to indicate that the conflicts between the parties will become sharper and more difficult to solve.

To achieve any workable solution it is essential that each party in the collective bargaining process recognize and understand the others' problems—though it need not agree with its aims. It is only through such mutual understanding that issues can be resolved.

It might well be a case of "mutual survival." Basic economic and political facts are stubborn; they have an amazing ability to force solutions to problems which are seemingly insurmountable.

L&HR Milestones . . .

● Steam power used on the L&HR. No. 5 at right, the "Pequest" used in the 80's contrasts strikingly with the powerful 4-8-4 type operated 1944-50 — and the 1600 ALCO Diesel shown below.

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. . . From First Annual Report to Stockholders, April 16, 1861.

In an exhibition of rare foresight, the directors of the fledgling 11-mi. Warwick Valley Railroad, the founder road of the Lehigh & Hudson River, thus assayed the prospects for their operation. To quote more fully — "It was well understood by those who had been mainly instrumental in promoting the construction of the Warwick Valley Railroad, that in all probability it would be but a link in a great chain destined to be one of the most important thoroughfares, and to effect an important influence upon the commerce and manufactures of a large portion of the States of New York and New Jersey and also of several of the New England States."

Today, the L&HR is indeed a key link in an important chain providing a fast, direct route to and from points West and South, and New England. The 11-mi. route of the Warwick Valley has grown to 96-mi. of well-maintained rail thoroughfare traversing parts of New York, New Jersey and Pennsylvania. The proud high stackers of the post-Civil War era contrast vividly with the efficient, 1,600-hp Alco diesels which haul L&HR freight today. The L&HR offers coordinated, all-rail service via the NYNH&H Maybrook Gateway with the following connections: CNJ-RDG-B&O-CSD; CNJ-RDG-WM-N&W; Lackawanna; Lehigh Valley; NYS&W-Seatrain Lines; Pennsylvania R.R.

Herewith are some of the "career" highlights in the annals of the L&HR: 1860 — Charter received . . . 1862 — Warwick Valley Railroad Co. officially opened, using Erie Railroad rolling stock . . . 1882 — The present name came into being after consolidation of Warwick Valley Railroad with Lehigh and Hudson River Railroad Co. . . . 1890 — Route extended to Maybrook, N. Y. and Easton, Pa. . . . 1905 — Agreement instituted to handle traffic interchange between Lackawanna and New Haven via all-rail route . . . 1939-Passenger service discontinued . . . 1950 — All diesel-operation . . . 1956 — Participation in piggyback service.

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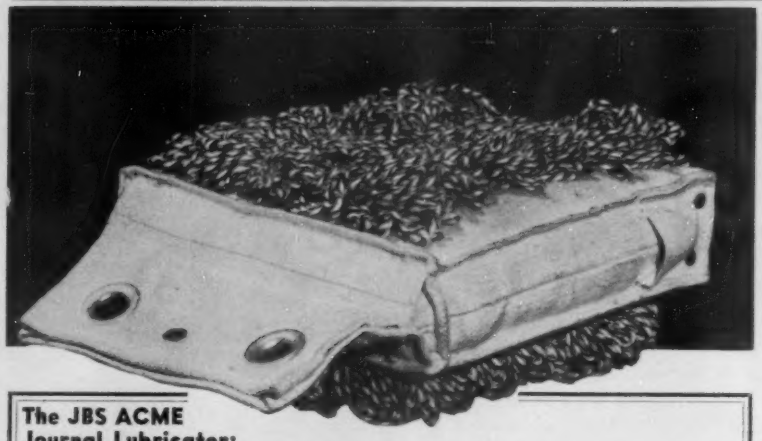

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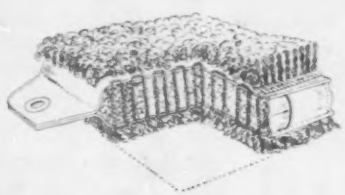

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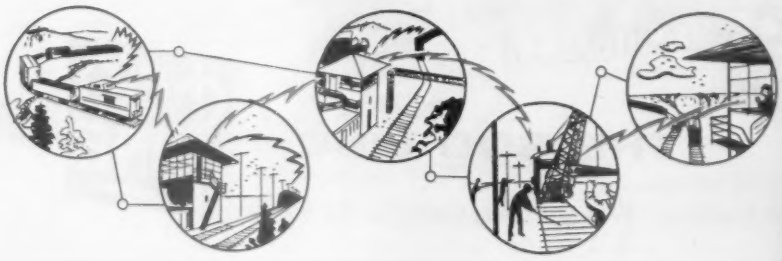

Highly efficient railroad communications have taken another giant step forward in recent years with the growing use of 2-way radio.

Central of Georgia is an excellent case in point. On their fast trains moving perishables north from Florida, constant radio contact helps keep things running smoothly and handles emergencies faster. In the yards, many switch engine hours are saved because Motorola 2-way radio keeps the yardmaster in touch with every switcher. Portable **Handie-Talkie®** Radiophones slice valuable time off car-checking operations. The list is endless, but it all adds up to greater efficiency, safety, and better service.

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ROADWAY—Look Ahead

(Continued from page 284)

wood, and for this reason track men as a rule are inclined to have a dim view regarding the possibility of developing a suitable substitute. There are practical thinkers in the field, however, who do not rule out the possibility that eventually a plastic tie may be developed that will be sufficiently low in cost to justify its use. Plastics are now available that have all the physical properties required in a crosstie, and, in addition, ties made of this material could be formed to the most efficient shape required by the loads carried on them.

Better Rail in the Offing

Among those who have expressed hopeful thoughts in this direction is G. M. Magee, the AAR's director of engineering research. Mr. Magee also foresees major advances in rail metallurgy and manufacture. He would like to see the development of a continuous process for heat-treating rail as it comes from the rolls. Such a process, he believes, would obviate the need for control cooling to eliminate shatter cracks which are the source of transverse fissures. A continuous melting furnace with subsequent casting and rolling of the rail into a continuous ribbon is another development which Mr. Magee doesn't believe is too far ahead.

Efforts should also be made to develop a cohesive ballast material to replace the loose-particle type now used, says Mr. Magee. He points out that a ballast of this type would shed water rather than allowing it to percolate into the subgrade, and that entrance of dirt and objectionable matter into the ballast section would be prevented. Nor could vegetation take root in it. As for the control of vegetation on the right of way, he foresees the possibility of further chemical development, perhaps including the use of mild radioactive substances.

There is no thought that the present type of track—involving T-rails, crossties and ballast section—will be superseded by a revolutionary type of construction. Present-day track not only performs its functions well but readily lends itself to renewal when the parts wear out or fail due to other causes. It can, however, be expected to undergo progressive improvement in ways calculated to enhance its performance and to extend its service life.

Much Line-Change Work Ahead

Another aspect of the outlook for roadway has to do with the prospect for large-scale line-improvement projects to eliminate undesirable grades, curvature and mileage. In his book, "Super-Railroads for a Dynamic American Economy," John W. Barriger sees the need for vast projects of this type, requiring a total expenditure of about $5 billion for all the roads. Such programs will require huge amounts of grading—but in facing this task the roads have a powerful ally in the mass-production grading equipment now available. A chart on page 284 shows how successful such equipment has been in holding the line on inflation of grading costs.

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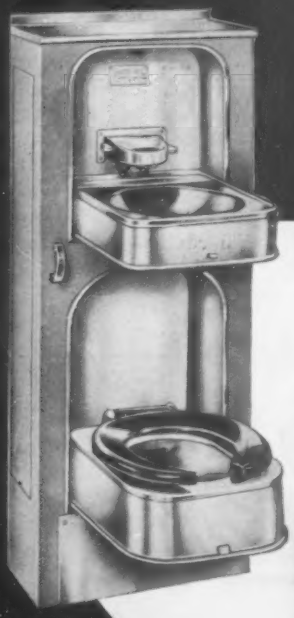

Model MA-214 Folding toilet and folding wash basin. Size: 20½" x 8½" x 48½" ht.

Model B-220 Fermo-Basin cabinet. 26" x 10⅝" x 34" ht.

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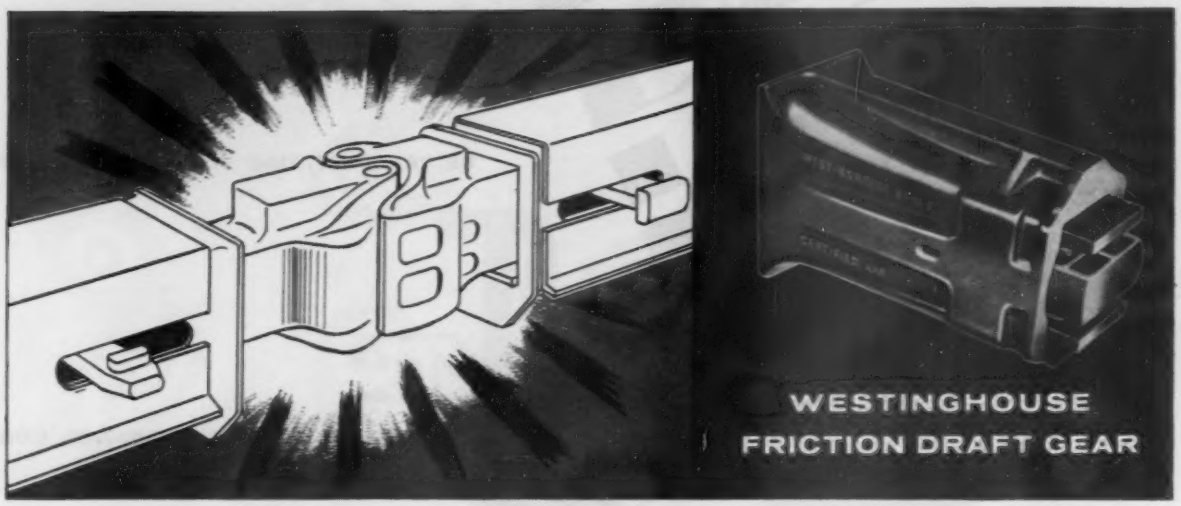

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FREIGHT EQUIPMENT

(Continued from page 297)

design of flat car which could be loaded either with a 200-ton transformer or lumber, or a similar shipment. The volume of traffic of the different shipments dictates to some extent the ability of a railroad to provide all-purpose cars.

The bulkheaded flat car is popular with lumber shippers, and farm implements shippers have no objection to the bulkhead. End loading is infrequent on flat cars so that the bulkhead, very helpful in preventing lading shifting en route, is not a serious barrier to most other shipments. Long poles are an exception. It is very probable that bulkheaded flat cars would not be acceptable for pole shipments. In short, the all-purpose car presents a number of real problems which the proponents of specialized freight cars recognize.

The TOFC (trailer-on-flat-car) shipment is one solution of the all-purpose car dilemma. Although this means of transportation is not without unsolved problems, it is obvious that all types of shipments—liquids, perishables, manufactured goods, almost any shipment except mine products, very large machinery, poles and possibly grain—can be handled by TOFC. If TOFC were universally in use, it would be necessary to have only a relatively few other types of cars to provide complete transportation service.

The problems with TOFC service are plentiful. If railroad passenger service is not expanded, it is to be expected that automobile transportation will increase. The highways are already crowded to the point where driving is hazardous. Large trucks accelerate the damage and shorten the life of highways. The highways would be more available for passenger travel if trucks could be handled in long hauls by TOFC. It seems needless to crowd the roads with trucks when we have a 225,000-mile rail system. More use of TOFC would be of general benefit, and would be helpful in improving motor highway travel and reducing road maintenance.

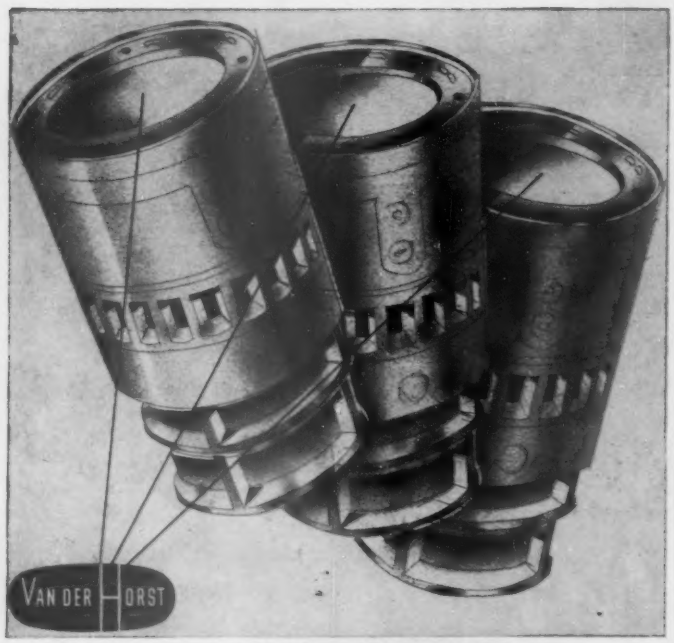
The other solution to the all-purpose car problem is the container-on-flat-car. If workable designs of containers are evolved, essentially the same cars used in TOFC can be used in this method of shipping. With the container-on flat-car (COFC), any commodity can be handled with the same general limitations as TOFC service. Containers can be moved from cars and delivered at destination on flat bed trucks. This system, from a weight and expense standpoint, has some advantages over TOFC. The trailer underframe and wheels are not required. Moreover, a better clearance situation is obtained, as the height of the container on the flat car is 36 inches or more under that of the trailer.

Thus, it appears that the car most likely to succeed in 1966 is the flat car.

As would be expected, the solution of the many problems will be required to bring about this transition. The flat bed trucks required for local delivery in the COFC system would have to be provided in quantity to prevent delay in final

(Continued on page 388)

5 *big advantages of*



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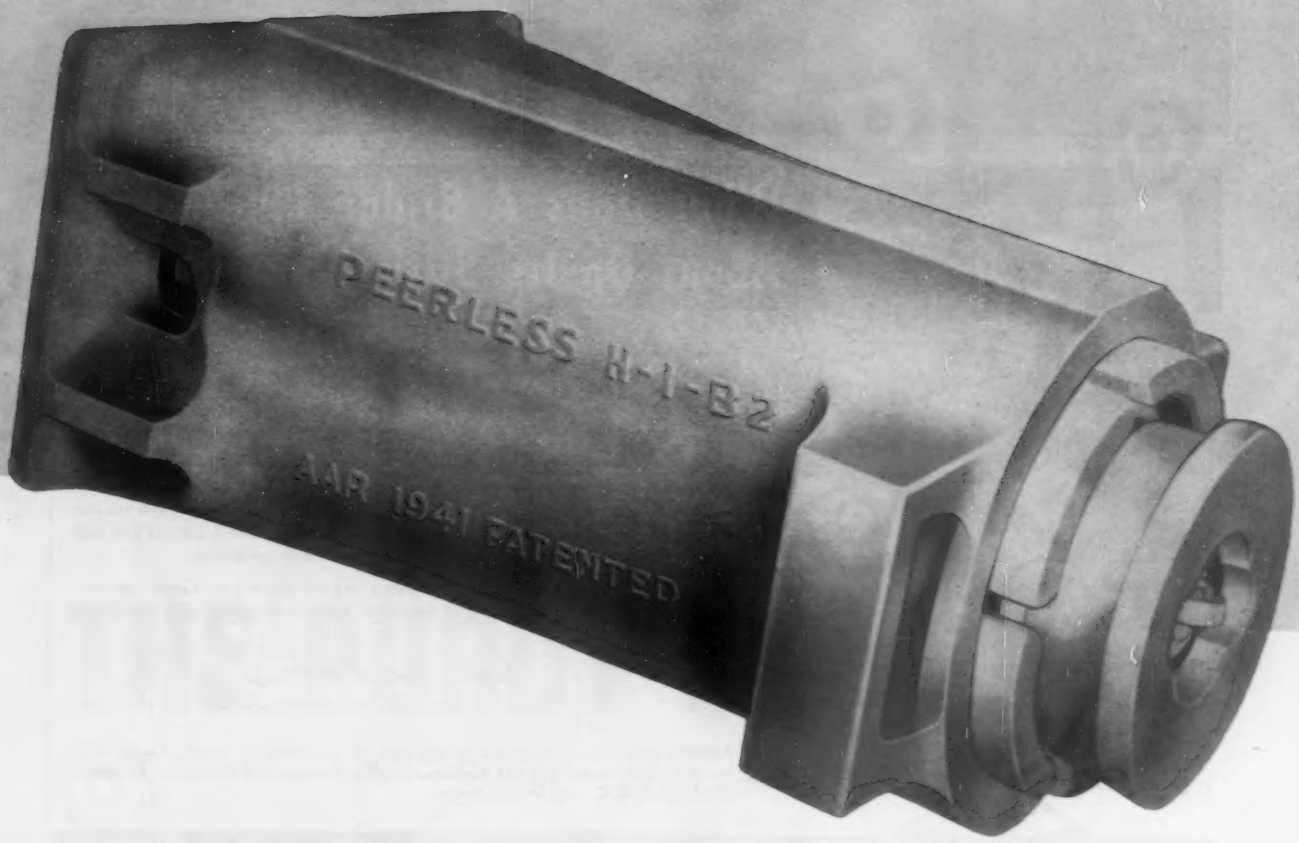

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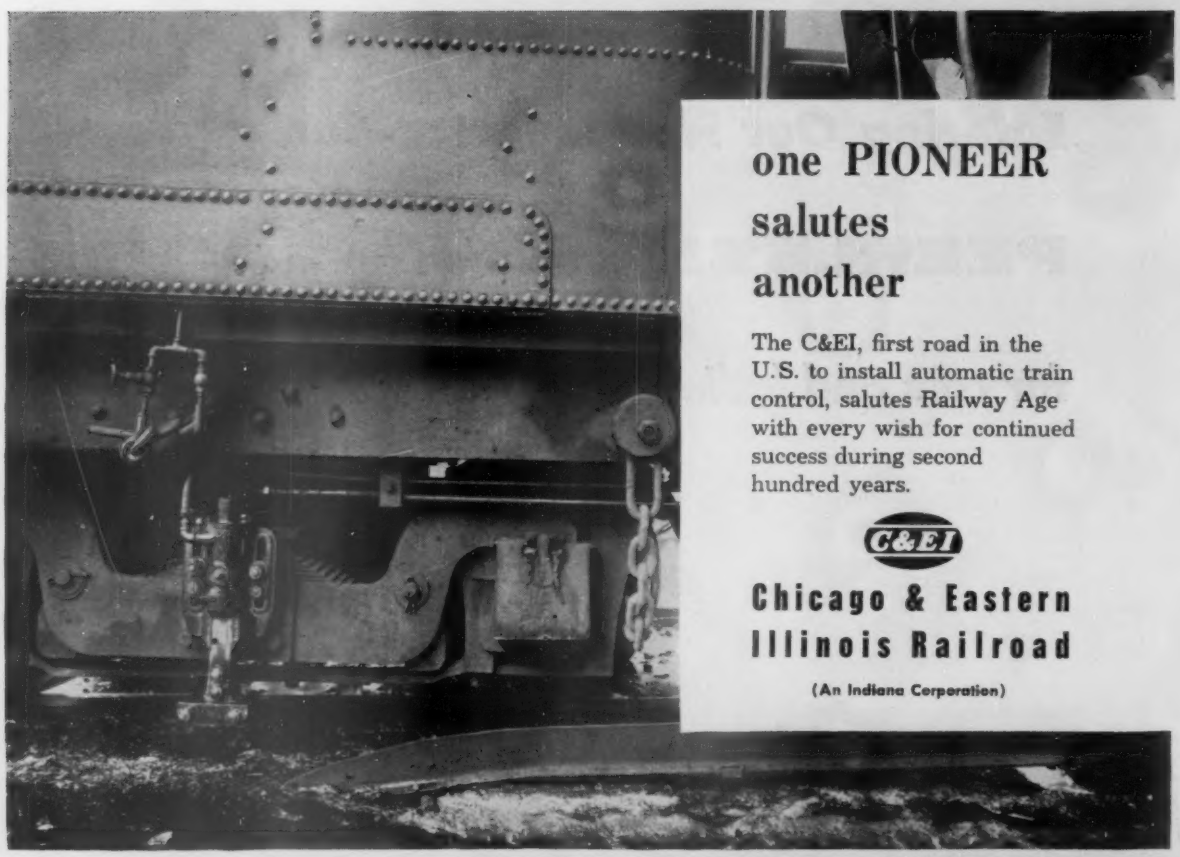

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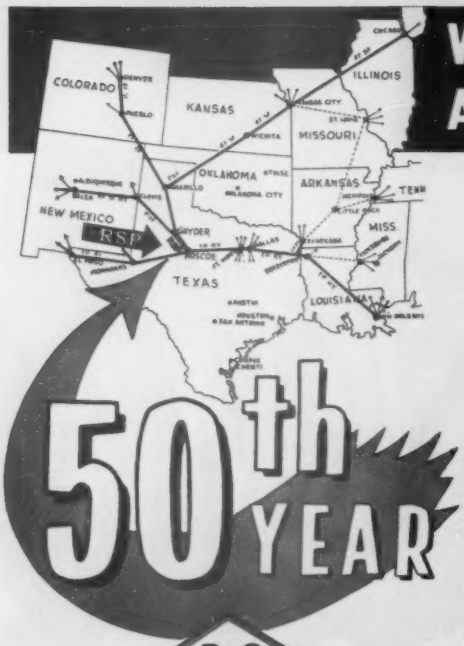

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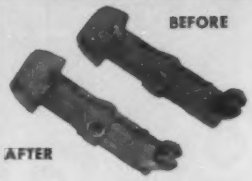

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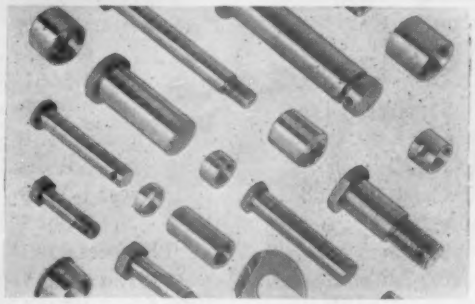

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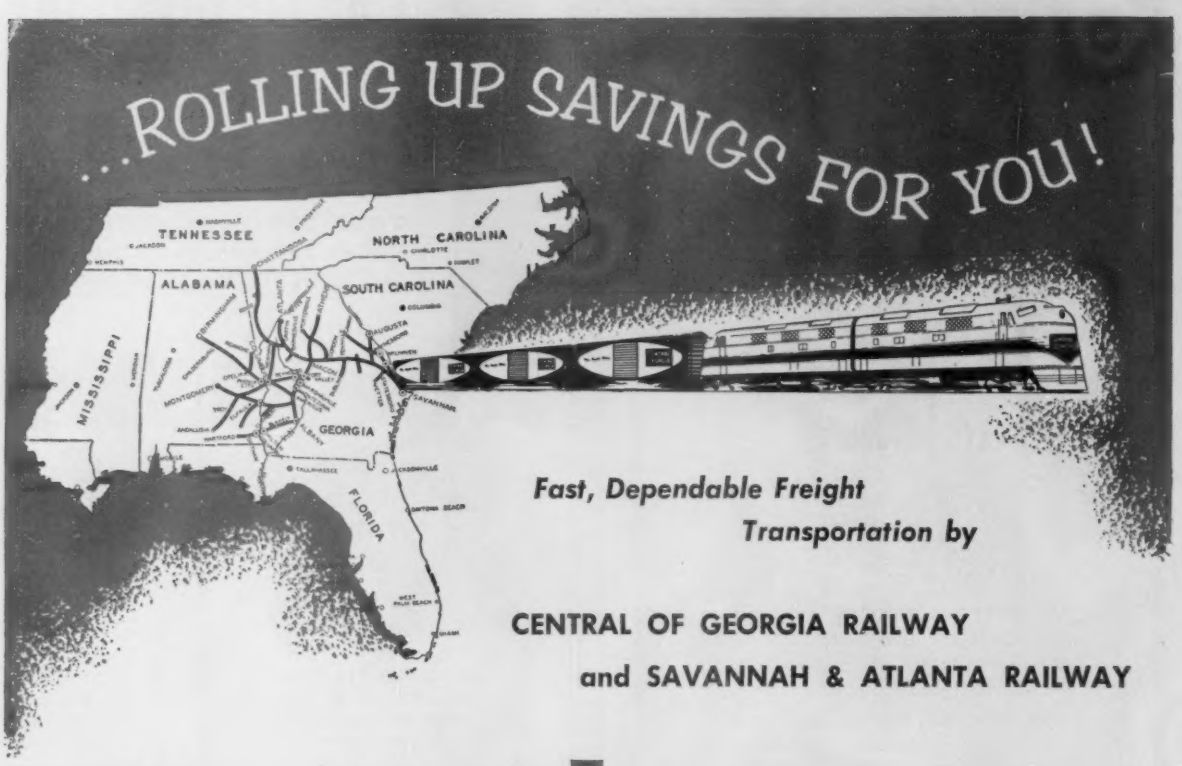

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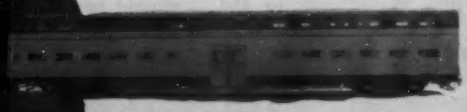

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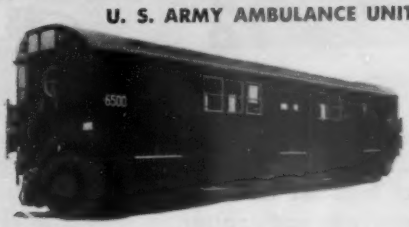

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FREIGHT EQUIPMENT

(Continued from page 380)

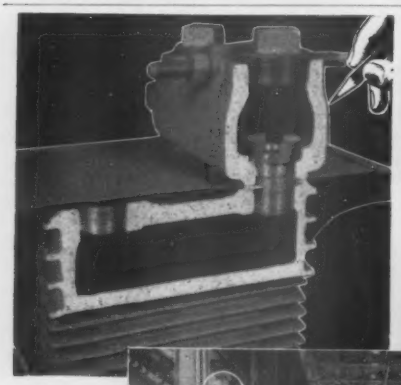
delivery to destination. Problems concerned with unloading containers promptly and returning them to the flat cars will also require attention. However, these difficulties do not appear to be insurmountable since this type of service is in use to a very limited extent at present.

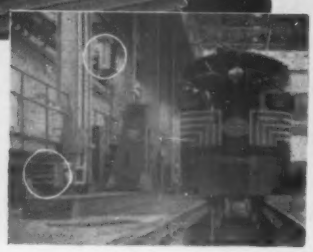
A method of shipment for coiled steel has been developed in the last few years. Protection from weather and prevention of damage to the coiled sheet edges are the two principal reasons for this development. Gondola cars are fitted with cradles to hold the coiled steel in such a way as to prevent damage, and a cover placed over the shipment excludes rain, dew and dirt. The sides and ends of the gondola become largely non-functional for such shipments, and here again the flat car may be used. It is now under consideration for these shipments.

The flat car ten years from now should be in more general use than it is at present. Whether it will have two four-wheel trucks of conventional design or be a four-wheel car, one design of which has already been developed, remains a question. It is sure to follow, to some extent, the trend so capably advanced in the new lightweight passenger cars.

Many of the new flat cars will likely have end bulkheads to simplify lumber shipments by avoiding load shifting and thereby facilitating mechanical loading and unloading. The bulkhead will be useful in container shipments and will not be a serious detriment to any lading with which it is not required.

Nothing affects freight car design more than the lading transported. Watch lading and shipping practices and you have the key to the future of freight cars.





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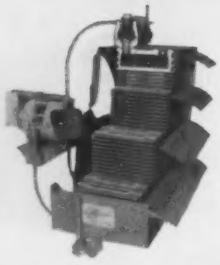

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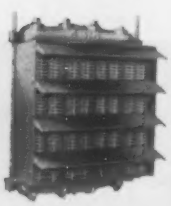

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ROADWAY—Look Back

(Continued from page 279)

fissures were caused by so-called "shatter cracks" in the steel, and that these could be eliminated by a form of heat treatment known as control cooling. With practically all new rail now being control cooled, the incidence of transverse fissure is declining rapidly and will probably sink almost to the vanishing point when all rail not control-cooled has been removed from track.

Development of the Split Switch—The stub switch was formerly commonly used as a means of diverting traffic from one track to another, but it was crude, hazardous and noisy. When an obscure blacksmith, collaborating with an equally obscure railroad man, hammered out the first split switch he unknowingly wrote a new chapter in the history of special trackwork, for his handiwork opened up unheard-of possibilities for increased speeds and safety in moving trains through turnouts.

Because these four developments, and the many other improvements that have been made in the track structure, occurred over periods of many years, it is doubtful that those who contributed to them had any conception of the impact they were to have on future events. From the vantage point of the present, however, that impact is inescapable.

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Published weekly by the Simmons-Boardman Publishing Corporation at Orange, Conn. James G. Lyne, president, Arthur J. McGinnis, executive vice-president and treasurer. F. A. Clark, vice-president and secretary.

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Workbook of the Railways

A. F. E.'s for the Next 100 Years

Like the "Authority for Expenditure" by which each project of new or improved plant is budgeted on a railroad, so must editors process A.F.E.'s of paper, time and energy. Here are the A.F.E.'s which will take highest priority in the next 100 years of Railway Age:

- **Information about rates, services and facilities which will build profitable railroad traffic (top billing).**
- **Ammunition for the fight for equal treatment by government of all forms of transportation and promotion of the health of common carriers.**
- **Stories about new tools and techniques for the industry —emphasizing what they'll do to costs and/or service.**
- **Latest developments in the selection, training, compensation and management of the people who run the railroads.**
- **Success stories of railroaders and their properties.**
- **Distillation of the most useful ideas posed by railroaders, suppliers and railroad customers.**

The next 100 years will see more emphasis than formerly placed on:

- **Methods and products of group "brainstorming."**
- **Experiences and ideas of industries outside the railroad business.**
- **Findings and urgings of the scientific laboratory.**
- **Use of specific costs in pricing, sales emphasis and management planning.**
- **The business-getting job of railroaders.**
- **Application of technology to paper work.**

The package for these contents will improve as the art of publishing progresses. Faster methods of production will cut the interval between "closing" an issue and mailing it. Illustrations will "work with" the text more closely, to increase reader comprehension. The art of charting statistics will develop so that the raw material will be molded to suit the frailities of him who reads as he runs. Photographs will improve along with their reproduction. The instant print camera and fast photo reproducer lie ahead in the near future.

Railway Age's continuing sample study of reader interest and preference (now in its fourth year) will be mined more deeply. Subjects which grow stale will be firmly eschewed. New interests of readers will be tackled as they emerge.

These, in brief, are the editors' goals:

1. To help increase the stature and profits of the railroads.

2. To fight for adequate authority and status for the railroad officer.

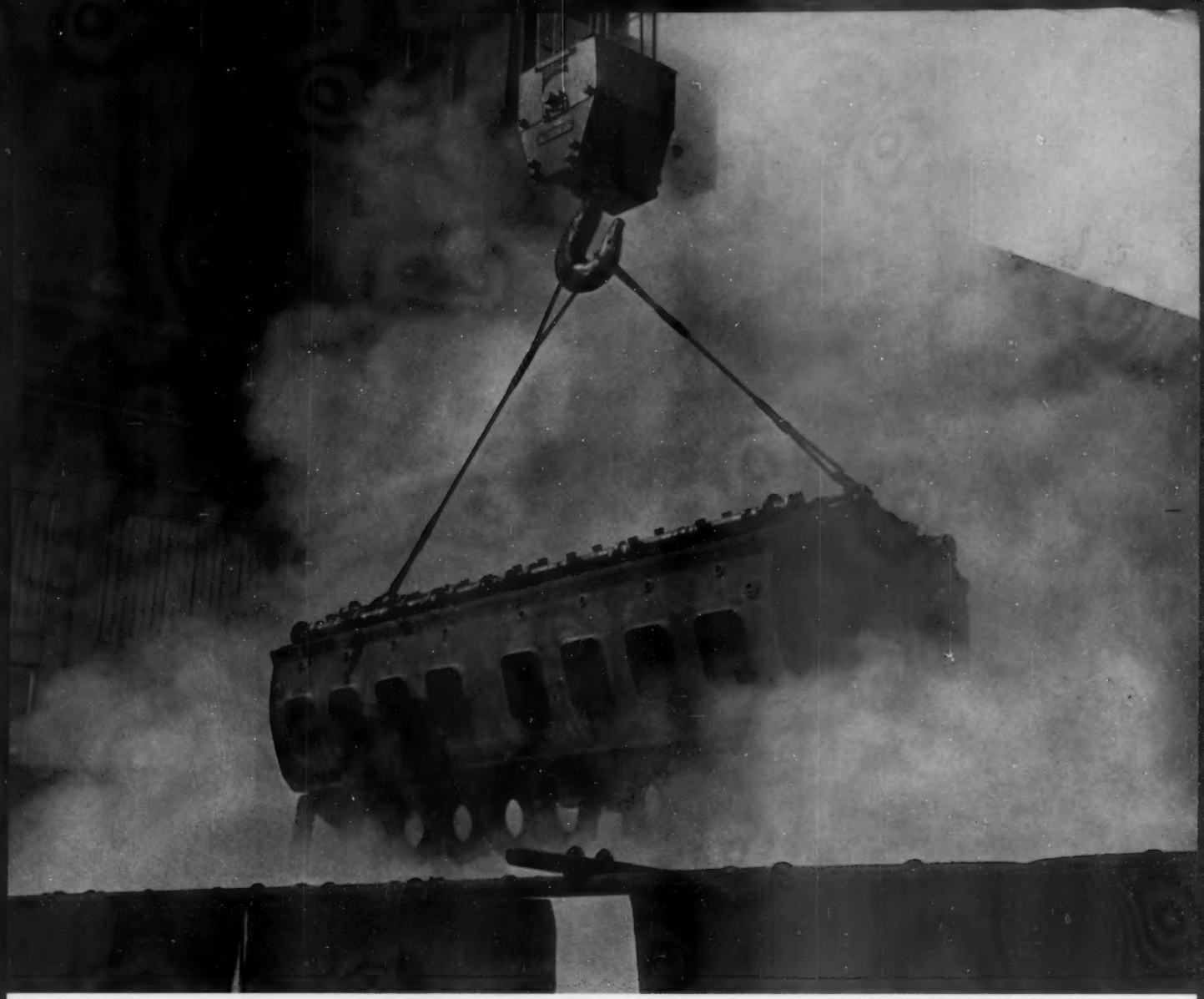
3. To see that every worthwhile tool, piece of equipment or idea gets attention.

4. To spread success—make the best in railroading the commonplace.

5. To break down departmental barriers.

Ideas—from whatever source—are the sole means by which the railroads can be kept great and made to yield more for their owners, officers and employees. It is the job of our "Workbook" to tell the news about those ideas speedily, attractively and accurately. Toward this end are our A.F.E.'s for the future.

THE EDITORS



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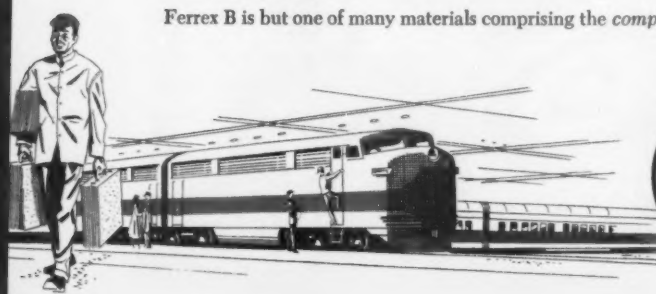

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